

MOTOR AGE

Developing the Good Roads Germ



By Darwin S. Hatch

WELL, sir, you were down here 2 years ago, when they ran the stone road past our farm from town, and you know I didn't get much excited about it, 'specially as I got to pay more taxes just on that account. I believe those motor car men in town and those college professors from down state, that talked so much about how much more the land would be worth, were right. You know Lem Williams' place over on the other side of town? He's 3 miles closer to town than we are, and you know his land is just as good and the place is fixed up a little better, if anything." Farmer Brown

chuckled as he continued with his views on the good roads question.

"They was a man out here last week—heard I wanted to sell—and we made a deal at \$160 an acre. I'm satisfied, but I heard he'd been dickering with Lem and I asked him why the deal fell through. He said, 'Well, I like that place over there better than this, except one thing—you're on a good road to town and he ain't, and I wouldn't give more'n \$150 for it.' Paid me \$10 more on account of rock road. Now Lem's in town trying to find out how to get the roads fixed up out his way."

There are a good many Lems throughout the country who recognize that the condition of the roads has a decided influence on the value of property, but who do not know how to get the neighbors and the road officials interested enough to spend dollars on road improvement. This is not a brief for good roads. No argument is needed, for practically every taxpayer admits their value in the abstract, but many hesitate about going down into their pockets when pinned down to their own case. The difficulty is in getting the movement started. The same conditions had to be faced and the same kind of people won over wherever road improvement has occurred. It is believed that the methods of arousing road enthusiasm that have succeeded elsewhere can be ap-

plied wherever a fight is now in progress.

Practically everywhere road improvement is needed the thinking portion of the population is aware that better highways would put money in the pockets of the community. In spite of this the roads often remain in bad condition, on account of the unwillingness of landowners to be taxed for improvements on roads that do not pass by their property. More often natural inertia is to blame, and all that is needed is that local interest in the subject be aroused. When some local enthusiast, inoculated with the good roads germ, appears and begins to agitate the question the infection spreads until the whole county, or state, perhaps, has the fever.

Take Iowa, for instance. It has become a habit whenever the road question is under discussion to point to that state as a model of what can be done by the organized effort of a few boosters. In March of last year Iowa's roads were no better than the average country highways. Through the energy of a few good-roads enthusiasts, state and county officials were aroused and a state-wide interest developed. Highway associations were formed in every city and county, townspeople and farmers turned out to work on the roads, until today, little over 1 year later, the state is covered with a network of improved highways, radiating from the state capital as a center and extending to all its boundaries. There are five main east and west roads running across the state from the Mississippi river to the Missouri river.

Iowa's Roads a Sample

A very small portion of the Iowa highways are gravel or macadam; the majority are simply dirt roads which are kept in first-class condition by dragging. Where necessary, extensive grading has been done and wet and swampy places tiled and culverts and bridges made safe for

heavy traffic. After every rain storm the landowners along the road get out with their road drags to take out the ruts and give the road a smooth-crowned surface that compares favorably with the asphalt boulevards of the city.

Stirring Up Enthusiasm

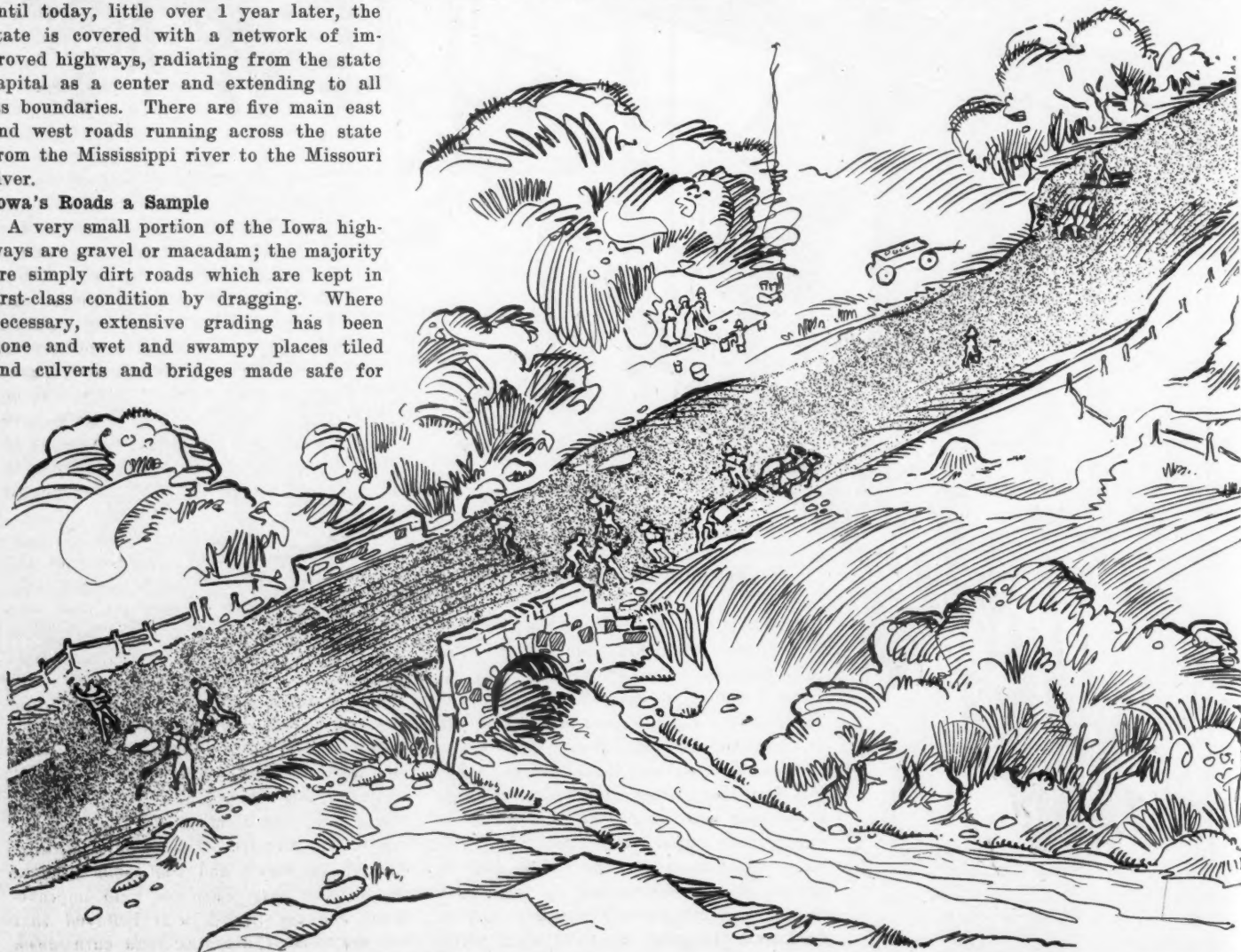
The Iowa roads had their actual beginning when Governor Carroll called the good roads convention in Des Moines during March of last year. This was attended by the county superintendents and the local good roads boosters, who were responsible for it. It was decided to have a continuous road, as near perfect as could be made from common Iowa dirt, extending from Davenport on the Mississippi to Council Bluffs on the Missouri. To make sure that the work would be done in the quickest time and everyone along the road do his share of the work, a day was appointed in the latter part of June as a good roads day. Promptly at 9 o'clock on the morning of the appointed day the farmers unhitched their horses from plows and cultivators, hitched them to the hundreds of drags, serapers and road machines that had been previously stationed along the 380 miles of the road, and in a single day the army of workers, stretching across the state, made one of

the best roadways ever constructed west of the Mississippi.

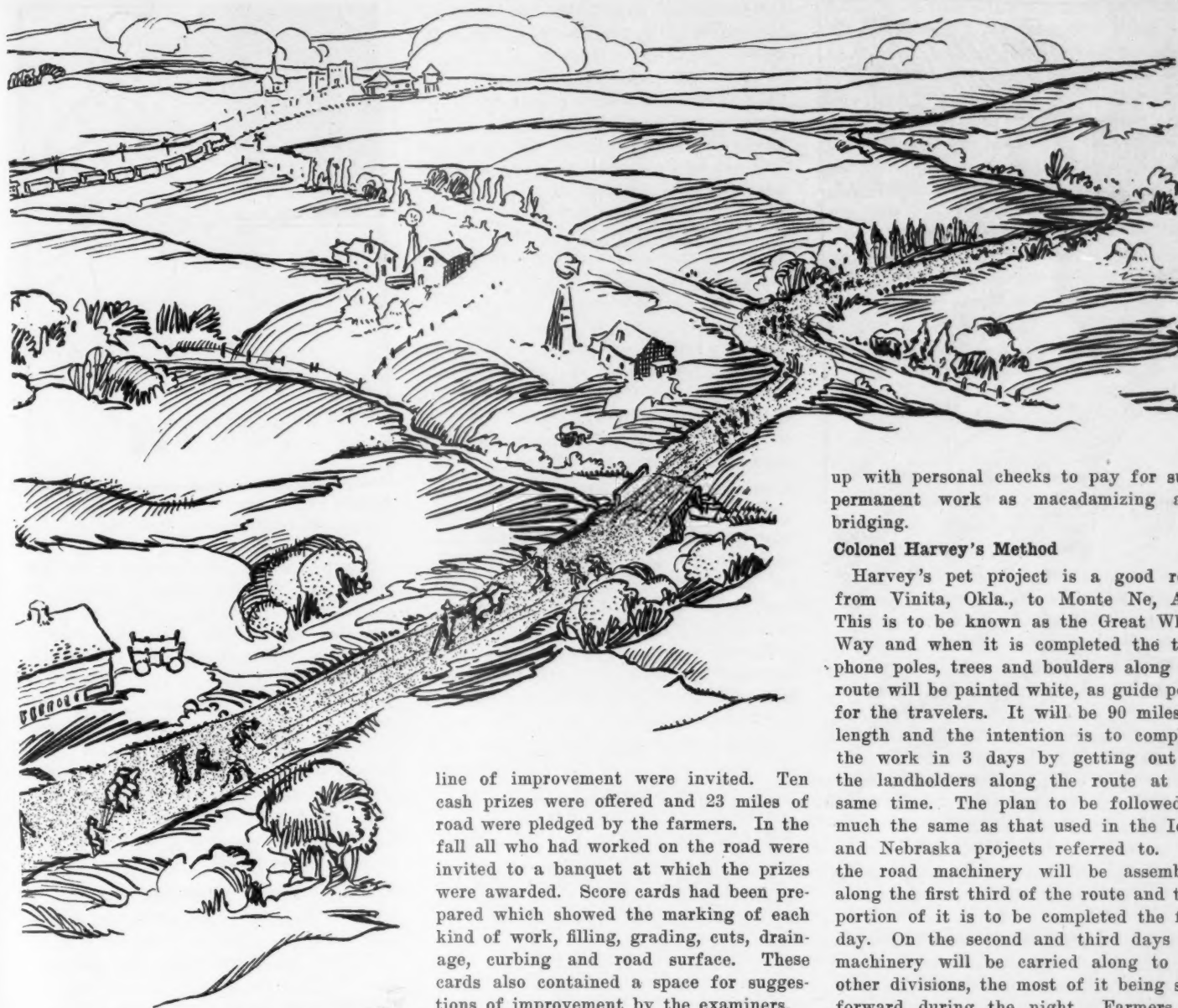
Nebraska, too, has accomplished much for improved highways by using the idea of setting aside a particular day as good roads day. In the little town of Diller, near the southern border of the state, the business men have subscribed money to build roads and offered money prizes to the farmers for the best mile of road under their care. This year the farmers themselves requested that instead of money prizes only honor prizes be awarded, as they had become interested enough to care more for the credit of obtaining a good highway than for any monetary consideration that could be offered.

Build Road in 3 Days

There was one particular hill in the neighborhood of Diller that needed grading very badly, so on a specified day every business house in the town was closed and every trousers-clad person reported at the hill for duty. For 3 days the business men of the town, assisted by the farmers, worked on the hill, leaving it properly graded with a hard smooth crown. The business men's association furnished a picnic dinner for the workers, which was served by the women of the



"IN A SINGLE DAY, THE ARMY OF WORKERS STRETCHING ACROSS THE STATE MADE ONE OF THE BEST ROADWAYS EVER CONSTRUCTED WEST OF THE MISSISSIPPI"



town and the latter take as much credit as their husbands for the improvement.

The road improvement in this neighborhood is all due to the energy and resourcefulness of one man. He is a real-estate dealer and his efforts were probably not entirely unselfish. In the spring of 1909 he gave a banquet at which he introduced a chart showing how improved highways around the town of Diller would bring business to the town. He also outlined a schedule of how the work was to proceed. The idea was at once accepted, the business men subscribed \$1,800, and the county commissioners were induced to provide suitable ditches for every mile of improved road.

The schedule called for the completion of 7 miles of road the first year, which was divided so as to give $1\frac{1}{2}$ miles to each of the roads leading out of town. In this way every farmer coming into the town traveled over 3 miles of good road, saw its advantages and became interested in the movement. The next year the business men's association took the initiative and started the work by a smoker to which the farmers living along the

line of improvement were invited. Ten cash prizes were offered and 23 miles of road were pledged by the farmers. In the fall all who had worked on the road were invited to a banquet at which the prizes were awarded. Score cards had been prepared which showed the marking of each kind of work, filling, grading, cuts, drainage, curbing and road surface. These cards also contained a space for suggestions of improvement by the examiners.

The Fever Spreads

But it was not alone in the vicinity of his home town that the real estate dealer aroused the good roads fever. Other communities in the state have become interested in the success of the movement at Diller. Some have already started work along similar lines and others are considering it. Interest is aroused to such an extent that the people are getting after the legislature for state-wide legislation on the subject.

Arkansas has always been held up to ridicule as a backward and unprogressive state, but the good roads fever has penetrated even there and has spread into Oklahoma. The principal carrier of the epidemic in that portion of the country is W. H. Harvey, who will be remembered as the author of "Coin's Financial School." He has been traveling over the country lecturing on road improvement and so great has been the interest aroused that the audiences he has addressed have stood up as one man and volunteered to turn out and work the roads. They have not only offered their personal services, but have backed this

up with personal checks to pay for such permanent work as macadamizing and bridging.

Colonel Harvey's Method

Harvey's pet project is a good road from Vinita, Okla., to Monte Ne, Ark. This is to be known as the Great White Way and when it is completed the telephone poles, trees and boulders along the route will be painted white, as guide posts for the travelers. It will be 90 miles in length and the intention is to complete the work in 3 days by getting out all the landholders along the route at the same time. The plan to be followed is much the same as that used in the Iowa and Nebraska projects referred to. All the road machinery will be assembled along the first third of the route and that portion of it is to be completed the first day. On the second and third days the machinery will be carried along to the other divisions, the most of it being sent forward during the night. Farmers residing as far as 5 miles back from the proposed route have volunteered the use of their men and teams and the grading gangs on the Kansas City and Memphis railroad have offered to move their whole camp onto the road and assist in the work.

The 1-day idea is also to be used in building the Lincoln way, a highway that will be constructed this summer from Louisville to the old home of Abraham Lincoln and which is to be the nucleus of a memorial highway from Minneapolis to the Gulf of Mexico.

Women Can Help

Much can be done in the way of arousing interest in road improvement by the women's clubs. It is usually noticed that when the women's club in any town becomes interested in a proposition some action is taken. The women's club of St. Louis has taken the initiative in this movement. A part of the plan is to have lecturers talk all through the country districts, particularly among the women. The club also is working toward having a simple system of road building taught in the city and country schools.

One of the members of the St. Louis



WHERE GOOD ROADS GOSPEL IS NEEDED
MOST

club has originated the cadet patrol, an organization of boys who keep watch of the roads and report all bad spots. Patrols have been organized in many counties of the state and others are springing up in other states. These patrols are based on the organization of the regular army, and the boys not only have their tastes for army life gratified, but are developing a personal interest in road maintenance, besides producing a marked improvement in the highways of the state.

Ambitious Project

Perhaps the most ambitious project in this country is that of the National Highways Club, an organization of forty multimillionaires of New York. The expressed purpose of this club is the building of national highways without taxation. The immediate plans comprise the building of a thoroughfare from New York city to Washington, D. C., which is to be extended later to other large cities. The highway is to be 144 feet wide and will have a broad footpath or sidewalk on each outer edge. Within these will be two public roads for horse-drawn vehicles, then two roads for motor cars, then two ways for commercial traffic. In the center is to be a double-track trolley road. The

estimated cost of construction for such a thoroughfare is placed at \$100,000 per mile.

Years ago, Sheridan drive was Chicago's finest boulevard, but while the southern portion of the drive is still kept up in excellent condition, the outer portion has been allowed to deteriorate until motorists now go out of their way to avoid it. This condition is due to two things: one of them is that the residents were few and unable to keep up the expense of maintenance, and the other was the early antagonism of the residents toward motor cars. In recent years many beautiful homes have sprung up along the suburban portions of the drive and the attitude of the original residents toward motor cars has suffered a decided change, many of them becoming ardent motorists themselves.

Repairing Sheridan Drive

The necessity of improving this highway has consequently appealed to them very forcibly and it was decided within the past few months to proceed at once with the work. To this end the property owners along the drive have clubbed together to repair it, the expense to be defrayed by subscription and the cost of maintenance to be met by annual dues of the club members.

Road improvement is being taught in the public schools of Pennsylvania and prizes are awarded by the local highway associations and commercial clubs for the best graduation essays on road building and highway improvement.

An instance of the way in which the local clubs in different communities may cooperate for better roads is shown in the improvement of the country roads between Chicago and Elgin, Ill. This route is one much traveled by motorists of Chicago and the vicinity who are attracted by the scenery along the Fox river. It is especially in demand at the time of the annual road races held at Elgin under the auspices of the Chicago Motor Club. The road stood much in need of oiling and repairing and the Chicago Motor Club took the initiative in the improvement of the Chicago-Elgin road, working through the promoters of the races, the Elgin Automobile Road Race Association. This association in turn interested the local commercial club which aroused the local county commissioners to the need. The commissioners fell in with the plan and after the township trustees and road supervisors along the way.

At the same time, the Chicago Motor Club took the matter up with the Cook county commissioners, who immediately offered to assist, and were carried out along the route in motor cars to interest the township officials in this county. This was followed by a junket of the motor club in which the road officials all along the way were gathered up and taken on a motor trip over the entire route. On this trip, the features of the plan were



HIGHWAY IMPROVEMENT TAUGHT IN
PENNSYLVANIA SCHOOLS

explained, the bad spots pointed out and suggestions for improvement made. It was explained how this road was to be extended to connect with the river-to-river road across Iowa and how it was ultimately to become a part of a great national highway stretching from New York to Yellowstone National park. Naturally, with the enthusiasm thus aroused and the pressure brought to bear from both ends the men who had the road under their care commenced work immediately and an excellent road will be produced in a short time.

As They Do It in Wisconsin

The Automobile Club of Ripon, a progressive Wisconsin town, adopted a novel plan for promoting highway improvement that is being followed by other clubs of the state. A committee of ten members was appointed and provided with eight split-log drags and two iron scrapers, and after every rain, the roads in the vicinity of the town are dragged and scraped. The secretary of the club has been authorized to call out all members with their cars, and each is assigned to a stretch of road and given a complement of men and tools. The day is spent in removing stones and refuse and giving the drags a clean highway upon which to work. The members do their share of the work without remuneration, while a certain amount is set aside to pay for the hiring of men and teams.

More than any other agency in the spread of the gospel of good roads is the influence of the improved roads themselves, particularly in a locality where the most of the roads are very bad. A short patch of perfect road will awaken a slumbering community to its needs in the matter of highways more quickly than anything else, by the actual contrast in the cost of hauling. One noteworthy instance is that of two brothers in North Carolina. The brothers are farmers and



ST. LOUIS CADET PATROLS REPORT BAD SPOTS IN ROAD

millers as well and they have built a model road through their farm which is traversed by every farmer who goes to the mill. A short stretch of the road is macadamized, but the major portion is simply a dirt road which has been graded and is kept in condition by the use of the drag. So well is it kept that it is difficult to tell when the transition is made from macadam to the improved dirt road. After using the road for a year most of the farmers are commencing to improve their own highways.

Railroads Get the Bug

Another model road was built by the Chicago, Milwaukee and St. Paul Railway in the town of Bangor, Wis. The roads were particularly bad there and the railroad management recognized the value of good roads as a traffic-increasing agency. Accordingly a model road $\frac{1}{4}$ mile in length was constructed and presented to the town. The road is regarded as one of the best pieces of macadam construction in the state and the neighboring farmers rather than the townspeople have begun to agitate stone roads in a way that promises great results in the near future.

Down in Dixie two railroads have joined forces to teach the value of good roads by example. A complete road-building outfit consisting of a rock crusher, steam roller and other machinery was purchased and loaned to the districts through which the railroads passed. Then the management of the roads set aside a fund to be used in assisting the towns to build macadam roads from their stations.

Do not imagine that these boards of directors of the railroads spent time and money in building model roads from their love of humanity. Railroad corporations are not usually credited with such dis-

interested motives. They did realize, though, that they were benefitting the country tributary to them and that their profits were to an extent proportional of the profits realized by the producers. They saw that good roads would bring more of the products of the country to their trains, which would mean dollars and cents to them.

Offered Model Highway

T. Coleman du Pont, the powder magnate, has offered to build a model highway through the state of Delaware. The road will be of immeasurable benefit to the state both as a highway and as an example of road building, but the donor cannot be credited with entire disinterestedness in his offer. Du Pont's plan is to build a highway from 100 to 200 feet wide the entire length of the state, 103 miles. He proposes building an improved road, using the materials best suited for a width of from 12 to 18 feet in the middle of the space acquired, the remainder of a 30-foot strip in the center to be planted with trees and grass. On the rest of the right-of-way he asks permission to build and operate a trolley line, telegraph and telephone lines, and to lay pipes for oil, gas, water, and electric conduits. In return for this concession, the highway is to be deeded to the state. The proposition is refreshing in view of the usual requests for franchises by public utility corporations.

In one instance, at least, the rural mail carriers have started the good roads ball rolling. The nine mail carriers working from the postoffice at Hasting, Mich., have offered to give \$25 to the farmers for each mile of good roads built according to the state reward requirements. While the financial inducement is not large it has aroused a spirited competition among the farmers for the honor of the awards.

Prize Method Used

In booming Iowa's Hawkeye highway the prize method was used to stimulate interest and create a rivalry among the different counties along the route. The Hawkeye highway association offered cash prizes to the county making the best showing on the portion of the road through its boundaries. At the same time the Sioux City automobile club has offered similar prizes for the best methods of marking the route through the cities.

Oftentimes it only requires the presentation of the proper tools to get the property owners along bad roads interested in the movement. This was found to be the case in Fond du Lac, Wis., where, in order to get the farmers interested in the movement, the Business Men's association distributed thirteen split-log drags

among the road superintendents. The drags were immediately put to work and the roads began to show a distinct improvement. When the townspeople show a willingness to be of practical assistance in this way the country residents will be found to cooperate with them gladly.

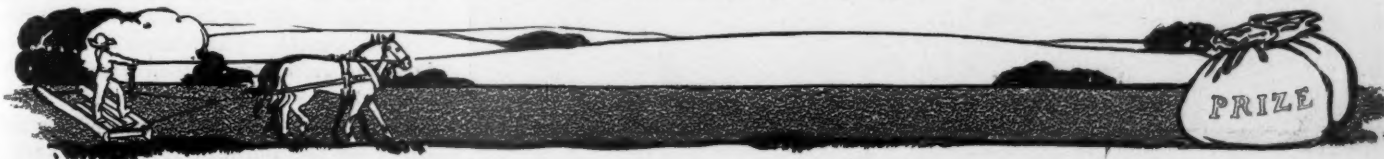
The ease with which the split-log drag can be made to improve even the worst roads would seem to preclude the possibility its not being used on account of unfamiliarity. Yet it is sometimes found that road officials hesitate to use it on account of the comparative newness of the device. It must be admitted that these drags are of little benefit if not rightly used. Where it is found that unwillingness on the part of the road officials to experiment is responsible, the method employed by another Wisconsin motor club may be followed.

Club Demonstrates Drag

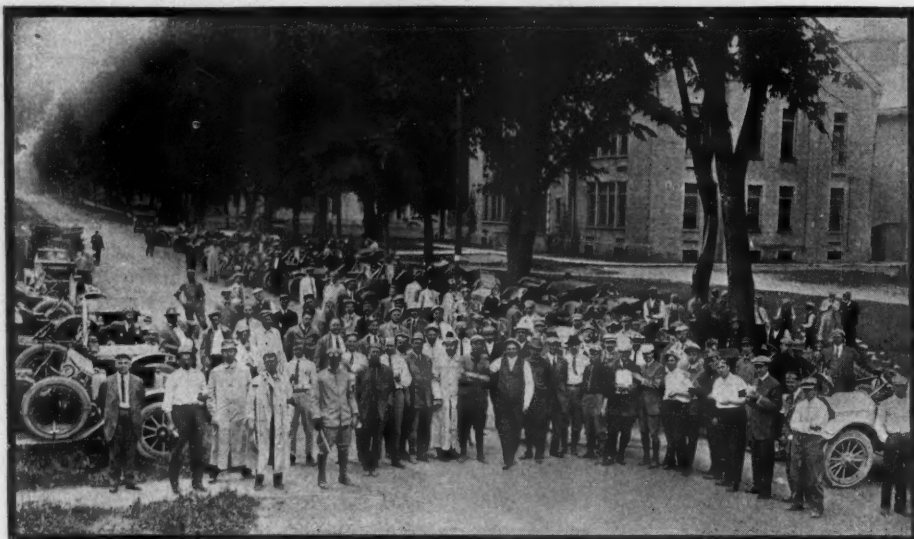
This club sent out a demonstrator with a King drag who visited each township in the county. In each township a demonstration was given for the benefit of the township officials and highway commissioners and a short stretch of model road completed. The inexpensiveness and quickness with which the work was done and the contrast of the before and after views has in nearly every case led the authorities to prosecute the highway improvement vigorously.



PRIZES ARE OFFERED FOR GRADUATION ESSAYS ON ROAD BUILDING



Cherry Circle Again Wins Team Match



CLUB MEN AT NOON CONTROL, MARENGO, FIRST DAY

CHICAGO, June 17—The greatest amateur motoring contest in the country, the one which so closely resembles this year's Prince Henry tour, but which antedates the German-English event by 3 years, the annual interclub reliability team match between the Chicago Automobile Club and the Chicago Athletic Association, was contested Thursday and Friday of this week and resulted in a victory for the Chicago Athletic Association representatives with a score of 284.5 to 685 for the Chicago Automobile Club.

This was the fourth running of the event and the third victory scored by the C. A. A. The run was to Janesville, Wis., and return, a total distance of 248 miles—128 miles the first day and 120 the second, covered at an average speed of 18 miles an hour. There were fifty-one entries, but scratches pulled the field down to thirty-five, twenty-two on the C. A. A. team and thirteen on the C. A. C., all of whom finished but one. Owing to the difference in the sizes of the two teams the C. A. A. was penalized only 13-22 of a

point which brought its total at the end down to 284.5.

The contest was an easy one of the A. A. A. grade 3 style, with penalties imposed only for work done on the road and for being late at control. Despite this, the affair proved to be really strenuous because of the run from Janesville to McHenry yesterday morning. The clubmen started off in a downpour of rain, which they did not mind much. But they discovered when soon out of town that the road was being repaired and there were several stretches that were nothing but sloughs of mud, which wrecked many perfect scores. Cars were stuck in the mud for several hours, and the trip was a hard one. Most of the cars, though, went through with clean sheets and reached the noon control on schedule. Referee N. H. Van Sicklen, Sr., took cognizance of the tip he received about the roads in the afternoon and he changed the route, sending the teams in by way of Algonquin and Elgin, instead of through Volo and down the north shore.

The run the first day was comparatively

uneventful, only three of the thirty-five cars being penalized. There might have been more, for the afternoon schedule was unwittingly figured at the rate of 21 miles an hour, instead of 18, and some of the drivers had to beat it to get in on time. Luckily no one was penalized, so the incident passed without protest.

No very serious trouble developed. Knisely of the C. A. A. team drew 130 points because of damage done to his differential housing when he hit a big rock that was hidden by grass. His warning saved others from getting into trouble at this point. Griffin of the C. A. C. had magneto trouble that brought him a big bunch of penalties, while Hyman of the losing team was penalized 195 points because he refused to quit. Mr. Hyman is treasurer of the Illinois Steel Co. and a man past the prime of life, but he pushed on to the end, even though he did not finish until 10:20 in the evening of the second day. It all was tire trouble on the return journey, and after using up many tubes he became disgusted and drove the last 40 miles on the rim.

N. H. Van Sicklen, Jr., of the C. A. C., withdrew on the return journey and took 150 points, figuring that if he had come in his penalties would have amounted to far more than that. His trouble was caused by his Apperson Jackrabbit not being constructed so tire chain could be used. He tried ropes, and these ropes persisted in getting in his driving chain, stretching it so it continually jumped the sprocket, so after fighting this for some time he diplomatically threw up the sponge.

Following the finish of the contest last night there was a supper at the Chicago Automobile Club, for which the losing team paid. The clubmen enjoyed this, as they had the luncheon served the first day when a Mais truck, serving as a commissary wagon, hauled the eatables from the C. A. A. to Marengo, the noon stop, where the contestants enjoyed a picnic lunch. Owing to the rain on the second day this plan was abandoned, and the clubmen took pot-luck in a country hotel at McHenry.

DEATH OF W. L. De La FONTAINE

Chicago, June 19.—W. L. De La Fontaine, vice-president of the Chicago Motor Car Co., local representative of the Packard, met death this morning near Elkhart, Ind., when he was thrown from a car owned by E. C. Patterson. The car skidded slightly on a turn and struck a wire rope extending from a telephone pole to the ground. This threw Mr. De La Fontaine from the chauffeur's seat at the side, where he was riding, the fall breaking his neck. He was 35 years of age and had been the Packard representative for several years.



STRETCH NEAR JANESVILLE THAT SPOILED MANY PERFECT SCORES

Gossip of Motor Trade From Detroit

DETROIT, Mich., June 19—Continued expansion is the order of the summer at the Detroit motor manufacturing plants. The latest announcement of this character is from President Benjamin Briscoe of the United States Motor Co., who says that, in a few days, work will be begun on an addition to the plant of the Alden Sampson company in the northern part of the city, which will raise the total floor space of that plant to more than 200,000 square feet, making it the largest plant in the world devoted to the manufacture of motor trucks, it is claimed by the company.

The Alden Sampson addition will make the entire length of the factory building 1,020 feet and will provide employment for 400 or 500 more men.

There exists at present a lamentable scarcity in Detroit of skilled mechanics. So marked has the condition become that the Packard Motor Car Co. has begun a systematic canvass of neighboring states in quest of men able to turn out the work. An employment bureau has been organized, and work is already in progress in several cities, with excellent results. Among the towns which are being drawn on are Cleveland, Erie, Youngstown, Niles, Warren, Akron, Columbus, Springfield, Dayton, Hamilton and Cincinnati in Ohio, and Indianapolis, Milwaukee, Michigan City and South Bend in other states. A new high water mark was set in May, and there is every reason to believe that this will be eclipsed by the orders for 1912 cars which are being booked in June by the Packard Company.

After more than 4,000 miles on their odometer to show for their last trip, President H. B. Joy and his party are back in Detroit with the new Packard six, which has been undergoing a strenuous test. The last trip took the party as far west as the Jackson's Hole country of northern Wyoming. This trip brought the mileage of the experimental car up to more than 55,000. Mr. Joy and his party dressed like plainsmen and roughed it for a considerable share of the last trip, making camp and sleeping wherever night overtook them.

As usual, the city is overrun with retailers, who make a trip to Detroit and an inspection of the new models an annual feature of their summers. All the manufacturers make it a point to greet their representatives with especial consideration, and a tour of the firm's plant is invariably a feature. This week will be notable at the Chalmers plant from the presence of the entire staff of salesmen and sub-dealers of the firm's New York representative, Carl H. Page & Co. Mr. Page's people will come in a private car and elaborate arrangements have been made for the trip of the New Yorkers who come to see the new models.



CHICAGO CLUBMEN ENJOYING A PICNIC LUNCH

TABLE OF RESULTS IN CHICAGO INTERCLUB TEAM MATCH

CHICAGO ATHLETIC ASSOCIATION—284.5

No.	Entrant	Car	First day	Second day	Total
1	C. T. Knisely	Diamond T.	0	77	77
3	S. W. Hamm	Cole	0	14.8	14.8
5	F. W. Wentworth	Rambler	0	0	0
7	W. G. Beek	Oakland	9.4	25.4	34.8
9	W. C. Thorne	Palmer-Singer	0	0	0
11	Walter Chamberlain	Rambler	0	11.2	11.2
13	C. A. Briggs	Chalmers	0	0	0
15	W. E. Davis	Chalmers	0	0	0
17	J. H. Dunham	Selden	0	4.2	4.2
19	W. F. Grower	Diamond T.	0	0	0
21	C. O. Owens	Packard	0	0	0
23	E. H. Young	Cole	0	0	0
25	W. W. Harlass	Mora	0	21.7	21.7
27	H. G. Jackson	Locomobile	0	41.5	41.5
33	Harry Daniels	Columbia	0	0	0
35	S. E. Hibben	Packard	0	0	0
39	A. E. Coon	Stoddard-Dayton	0	13.2	13.2
43	W. W. Jaques	Stearns	0	0.6	0.6
45	C. E. Jaques	Stearns	0	0	0
47	E. Bolter	Locomobile	0	54.5	54.5
49	A. Ortmeyer	National	0	10.6	10.6
51	L. T. Jaques	Peerless	0	0	0

CHICAGO AUTOMOBILE CLUB—685

2	A. S. Ray	Stearns	0	38	38
4	Henry Bosch	Stearns	0	9	9
6	T. J. Hyman	Chalmers	4	191	195
8	E. T. Franklin	Moon	0	0	0
10	N. H. Van Sicklen, Jr.	Apperson	0	150	150
14	G. F. Griffin	Marion	0	220	220
16	Charles Turner	Knox	0	64	64
18	P. J. McKenna	Pierce-Arrow	0	0	0
20	John Magee	Stearns	1	6	7
22	W. H. Jones	Winton	0	2	2
24	W. Egemann	Rambler	0	0	0
28	H. H. Fryette	Halladay	0	0	0
30	Carroll Shaffer	Stevens-Duryea	0	0	0



CHICAGOANS STRIKE STRETCH THAT IS BEING REPAIRED



MOTOR AGE

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Society of Automobile Engineers

THE 3-day session of the Society of Automobile Engineers last week demonstrated that a new force has taken hold of the motor car industry. A few years ago when this society numbered its members in fives and tens it was not looked upon as an important factor in solving the problems of the industry; but today, when it numbers its members up in the hundreds, it has demonstrated itself to be the strongest factor existing which works for the benefit of the motor car industry. The work done during the last 18 months has been phenomenal. In that period the society has, through its committees on standardization of the many motor car parts, reduced the cost of car production to the manufacturer and also simplified the problem of car maintenance to the owners. A few examples will illustrate this: Instead of 1,500 different sizes of seamless steel tubing for motor cars there are now a few more than 200. The result is that the manufacturers are not troubled with making so many different sizes and consequently the cost of production is lessened. Having fewer sizes it is possible for the tube manufacturer to carry these in stock so that the car maker has not to place special orders and wait for deliveries. This, too, is a great value. To the car owner the value is also apparent. If he has to buy repair tubing for any part of a car it will be possible for him to get it from a hardware store which carries standard lines; whereas, if an odd size were used on his car it would be impossible to get this at any hardware store in the country and it might be necessary to wait until a special order was put through the tube mill for it.

BUT the activities of the Society of Automobile Engineers have gone far beyond the realm of standardization and they are today grappling with problems of vital interest to every owner of a motor car. The federal government has realized the importance of the society and by asking it to report on the problem of the proper taxation of motor and horse vehicles on the public highway has recognized the real functions of this society. It is imperative that the leading organization of this nature be closely in touch with the road government departments which have to do with formulating horsepower taxes for motor cars in the different states.

THE society has shown its grasp of the motor situation by stepping into the breach now existing between the salesman of the commercial truck and the prospective buyer. Members of the society realized that selling a truck is different from selling a touring car, and that if the commercial industry were to progress as conditions warrant it, the bull must be taken by the horns and an organized effort made to elevate the standard of the commercial salesman. By papers read and discussion at the recent session it is evident that the success along this line is already assured. The suggestion that every truck maker employ an executive engineer, whose duty it shall be to impart technical information to the salesman and report to the factory on the individual needs of buyers, is a good one. Truck manufacturers should realize at the outset that the needs of the prospective buyers should be examined by an engineering expert. This is done in railroad enterprises, it is done in the mining field, it is done in a score of other industrial fields, and should be done in the truck field. It is folly to sell a man a 3-ton truck when a 5-ton one will be the only economical solution. That company is making a mistake when it does this simply to dispose of a single vehicle. It will inevitably lose sales. It may sell one truck but will stop others.

Nineteen-Twelve Improvements

THE year 1912 will be prolific in motor improvements. Compared with it the progress made in 1910 and 1911 will in many respects appear small. Already signs of startling innovations are exhibiting themselves in many quarters. One concern has announced a rotary-valve engine which has been tested out for many months and the patents covering which are now owned by one or two of the big motor car manufacturers. This engine is described in this issue. That the rotary valve will operate satisfactorily was proven 8 years ago, when that American motor pioneer Elwood Haynes designed and manufactured one which ran with entire satisfaction, but which was dropped at that time because of the landslide of public and engineering sentiment to the poppet-valve type. Since then a change has come over the trend of public opinion. The poppet valve has been refined and developed to the highest state of perfection, and in this development its shortcomings have been discovered. Now the engineer feels that there is a greater field with the rotary or with the slide valve, and the development of the rotary valve in America will be watched with particular interest during the next 6 months.

THAT there promises to be even a greater innovation in America in motor lines than in the rotary valve, namely, the slide valve. Six years ago, when the Knight type of slide valve motor was first built in Chicago it was ridiculed by many of the manufacturers. Since then it has been adopted by four or five of the best known car manufacturers in Europe, some of whom have entirely given up the manufacture of poppet-valve engines and are building nothing but the Knight type. Already rumors are afloat, and they are well founded, that at least three prominent American car manufacturers will use the slide-valve Knight type of motor for 1912; and in addition reports have it that some of the large motor manufacturers will build it for the open market. This motor is going to have a wide effect on the American market. It does not come as a flash of lightning from a clear sky. Rather it comes as a well known construction. Its efficiency has been proven beyond doubt in official tests in Europe.

THE long-stroke motor has been a topic of general discussion in America for the last year and is bound to exhibit itself in more than 50 per cent of the 1912 models. It is not a long-stroke type because the stroke will not be sufficiently in excess of the bore to warrant this name. A better name would be the rational-stroke engine. The word rational is suggested as embracing a motor in which the stroke brings us from one-quarter to one-half in excess of the bore. Seven years ago the accepted motor had a stroke one-quarter in excess of the bore so that the present tendency to lengthen the stroke is simply a reversion to conditions as they were years ago. In the meantime the short-stroke engine rose in popularity, because of the imagined superiority of it for speed purposes. Within the last 3 years it has been demonstrated that rational-stroke engines are capable of greater speed than short-stroke ones; that these motors have a higher thermal efficiency; that they have a higher mechanical efficiency; and that they are lighter in weight. With all of these acknowledged advantages there is no reason why the rational-stroke engine should not constitute one of the 1912 motors. The problems of proper balancing of rational-stroke motors were serious at one time but these have been competently wrestled with in many ways, so that the trouble has been eliminated to a great extent.

Great Speed Expected In French Race

PARIS, June 10—With a 3-liter cylinder limit—183 cubic inches—governing the light-car race at Boulogne on June 25, it is probable that the great majority of the competitors will adopt a four-cylinder motor with bore and stroke of 3.1 by 5.86 as the combination likely to give the best results. And with a motor of these dimensions the various engineers declare that they have been able to obtain from 54 to 70 horsepower on bench tests, and estimate on a maximum speed of 90 miles an hour over straightaway level roads. The cylinder dimensions are a testimony to the value of the long-stroke idea, for under a rule which favors a short-stroke motor constructors have not hesitated to adopt the rather high ratio of 1.86 to 1.

It is probable that the motors in this race will be capable of division into three distinct classes: the L-type adhering as closely as possible to standard design; the T-type of cylinders adopted in order to obtain greater valve area; and motors in which everything has been sacrificed in order to obtain increased power, the overall length being increased in order to accommodate multiple valves, or, as in the case of Peugeot, a V-type of casting adopted in order to decrease the length of the crankshaft without reducing any of the space available for large and multiple valves. The various designs will certainly be examined with interest, for they will be a complete exhibition of what European constructors consider to be the ideal type of motor for the light car.

Owing to the hilly nature of the course four-speed gearboxes will be the rule, most of the cars having direct drive on third speed with a geared-up fourth. The only exception will be Sizaire-Naudin, whose system gives direct drive on all four gears.

The light-car race will be one of the finest exhibitions of driving talent since the abandonment of the big car races. Among the drivers who have been engaged is Arthur Duray, formerly the Dietrich racing crack, now a demonstrator with the French branch of the English Daimler company, who has signed to drive one of the Excelsior racers. It is practically certain, although the contract has not yet been signed, that Hemery will be the driver of one of the Gregoire cars. Other well-known drivers who have been secured for this race are Rene Hanriot, formerly with Darracq and Benz; Louis Wagner, the winner of one of the Vanderbilt cup races; Bablot, late of the Brasier team; Rigolly, of Gobron fame; Rigal, of the Bayard-Clement Co.; and Porporato, for a long time with the Berliet company. All these are men who have made their name on heavy, practically unlimited powered cars, and who have not driven light cars since the days when an average of 40 miles an hour was considered a stupendous undertaking.

Small Cars Promise Sensation In Road Contest Over the Boulogne Course Next Sunday



June 24—Brighton Beach races, New York, National circuit.

June 24—Hill-climb of Quaker City Motor Club, Philadelphia.

June 22-28—Four-state tour of Wolverine Automobile Club, Detroit.

June 25—Grand prix of Automobile Club of France.

June 25—Endurance contest, Denmark.

June —Hill-climb, Norristown Auto Club, Norristown, Pa.

June —Reliability run of Denver Motor Club.

June —Reliability run of Oklahoma Auto Association.

July —Track race, Panhandle Auto Fair Association, Amarillo, Tex.

July 1-3—Reliability run of Motor Contest Association through Catekills.

July 4—St. Louis Manufacturers' and Dealers' endurance run, Missouri Automobile Association.

July 4—Hill-climb, Port Jefferson, L. I.

July 4—Road race, Kern County Merchants' Association, Bakersfield, Cal.

July 4—Track meet of Wolverine Automobile Club, Detroit.

July 4—Track meet, Denver Motor Club.

July 4-20—Prince Henry tour.

July 7—Track meet, Taylor Auto Club, Taylor, Tex.

July 8 or 15—Track meet, Norristown Auto Club, Philadelphia.

July 9—French grand prix road races.

July 11—Hill-climb, Worcester, Mass.

July 14—Truck run of Quaker City Motor Club.

July 17-22—Reliability run of Wisconsin State Automobile Association.

July 17-19—Reliability run of Cleveland News.

July 25-29—Motor events, North Dakota state fair, Grand Forks.

July 29—Belmont track meet, Philadelphia.

August 1—Truck run of Chicago American.

August 3-4-5—Beach races at Galveston, Tex.

August 12—Reliability run of Quaker City Motor Club.

August 12—Track race, state fair grounds, Detroit, Mich.

August —Hill-climb of Denver Motor Club.

August 25-26—Road race, Elgin, Ill., National stock chassis races.

September 1—Reliability of Daily Oklahoman.

September 4—Track meet, Denver Motor Club.

September 7-8—Track meet, Philadelphia Auto Trade Association.

September 9—Track meet, St. Paul state fair grounds.

September 12-13—Track meet, State Automobile Association, Grand Rapids, Mich.

September 15—Track meet, Appalachian Exposition, Knoxville, Tenn.

September 16—Track meet, state fair grounds, Syracuse, National circuit.

September 18-20—Truck reliability of Chicago Motor Club.

In view of the enormous difference in action between a heavy car of 150 horsepower and these light weights capable of practically the same speed as the grand prix monsters, it will be interesting to watch the old-time champions at work side by side with such men as Sizaire, Naudin, Boillot, Goux, Zuccarelli, and De Marne, who have spent practically all their lives driving lightweight speeders. There are plenty of experts who consider that the old school, trained to drive road locomotives which hold to the road perfectly, will experience considerable difficulty in handling these skittish lightweights at speeds of 80 and 90 miles an hour.

TAFT JOINS TOURING CLUB

Washington, D. C., June 17—Frederick H. Elliott, secretary of the Touring Club of America, was here yesterday and in company with Vice-President J. S. Sherman, went to the White House and presented President Taft with a full set of Blue Books. The president was delighted with the gift. He also accepted honorary membership in the organization.

With the opening of an office of the touring club in this city under direction of Leroy Mark, Secretary Elliott announced the club's advisory committee here. It is headed by Vice-President Sherman, who is the honorary chairman, and other members include W. Piatt Andrews, Logan Waller Page, General Clarence Edwards, Major A. W. Butt, Commissioner C. H. Rudolph, prominent government officials, and the following business men: E. B. McLean, Rudolph Kaufmann, C. J. Bell, S. A. Luttrell, J. M. Stoddard, B. W. Woodruff, M. T. Pollock, T. S. Johnston, G. H. Schutt and Dr. Ralph Jenkins.

ILLINOIS STATE MEETING

Quincy, Ill., June 16—The Illinois State Automobile Association held a directors' meeting here yesterday which resulted in the stirring up of considerable enthusiasm among motorists in this section of the state. The Quincy Automobile Club acted as host and the session was preceded by a luncheon and a parade of cars through the parks. The meeting was held in South park and many Quincy club members attended, listening to the remarks of President A. J. Williford of the state association on organization. Then the good roads hereabouts were inspected. The meeting passed resolutions asking for the introduction of bills into the legislature favoring the construction of a state road from Chicago to East St. Louis, the enactment of legislation preventing the throwing of rubbish on the highways and calling for good roads legislation. Harvey Riggs of this city was added to the good roads committee.



PRESIDENT SOUTHER AT LEFT AND EX-PRESIDENT COFFIN AT RIGHT. DISCUSSING AVIATION WITH AVIATOR COFFYN IN THE CENTER

DAYTON, O., June 17—One of the most successful summer sessions of the Society of Automobile Engineers, extending over a period of 3 days, came to a conclusion here this evening and the members of the society in attendance unanimously voted that the meeting was one of the most valuable and productive in

The Society of Automobile Engineers

Session Lasts 3 Days in Which Time Important Business Is Transacted—A. L. A. M. Turns Over Its Data to S. A. E. Including Famous Horsepower Formula — Interesting Reports Are Received From Committees Appointed on Standardization



ENGINEERS IN FRONT OF THE N. C. R. FACTORY

the history of the organization. All told, 286 members registered during the 3 days, these members being representatives of all departments of the industry from chief engineer down.

It was not all work, there being a good distribution of recreation with business. The opening session on Thursday morning was well attended, and after the president's address, the receiving of reports and reading of papers was taken up vigorously. The afternoon was given over to sightseeing, motor cars and trucks being provided to take the engineers through the National Cash Register Co. factory, where an illustrated lecture was given. After this the aviation grounds, 12 miles out of Dayton, were visited, where aeroplane flights were given by Wilbur Wright and other aviators. Thursday evening was a business session devoted to commercial vehicles, at which two papers were read and a general discussion entered into.

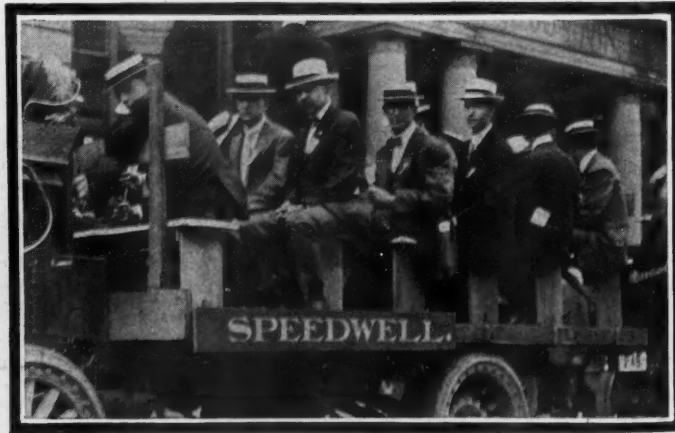
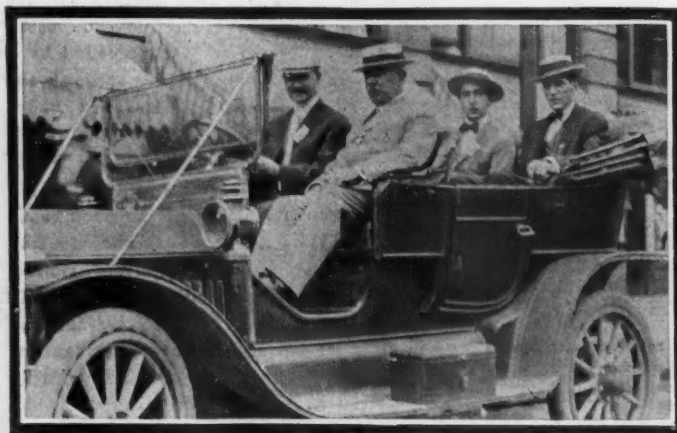
There were two sessions on Friday, a professional session in the forenoon and vis-

its during the afternoon to the factories of the Dayton Motor Car Co., the Wright aeroplane factory, and the plant of the Dayton Steel Foundry Co. In the evening all the members attended a theater party as guests of the Dayton chamber of commerce.

Saturday's program included a professional session during the forenoon, a luncheon at the Country Club by the chamber of commerce, and a field day afterwards. At the luncheon an address was given by Arthur Ludlow Clayton, associate editor of the *Automobile Engineer*, London, England. The field day sports included a baseball game between the accessory and motor car engineers, which the former won.

Work of the Sessions

The work of the sessions lent itself to two divisions: One the reading of eight specially prepared papers on topics relating to the motor car; and the receiving, discussing, and adopting of reports by more than a dozen committees on the standardizing of the various parts con-



AT THE ENGINEER'S CONVENTION
IN THE FRONT SEAT IS H. M. SWETLAND, A LEADER IN S. A. E. FINANCES—GROUP OF ENGINEERS AT RIGHT

Holds Midsummer Meeting in Dayton

United States Government Asks Society To Take Up Matter of a Rational Taxation of Motor and Horse Vehicles for Road Traffic—Special Committee Will Take Up Question and Submit a Report—S. A. E. Handbook Makes Its Appearance



A LINE UP OF ENGINEERS READY TO START FOR AVIATION FIELD

needed with motor cars. Never before in the history of the S. A. E. has there been such general and meaty discussions on matters before the society. This discussion was particularly so when such matters as specifications of steel for motor cars, construction of broaches, carbureter flanges, spring specifications, and sheet metal features were under discussion. Frequently President Souther was compelled to close discussions before all the members had an opportunity of expressing themselves on the matter.

So valuable has the work of standardization become that the Society of Automobile Engineers is taking a leading position among engineering societies in America. This was indicated by several acts of the society during the 3-day session. The general scope of the society was well covered in President Souther's address, which is printed on pages 18 and 19 of this issue. In addition to the work outlined in his address there were many points of great interest brought out. The secretary's report showed that the mem-

bership of 320 in July, 1910, had increased to 920, with many pending applications.

Now S. A. E. Formula

One official act of the meeting of the session was to accept all of the data handed to the society by the now extinct Association of Licensed Automobile Manufacturers, among which might be noted the horsepower formula and the several standards for bolts, nuts, yoke ends, spark plug threads, etc. adopted by the A. L. A. M. In the future all of these standards will be known as the S. A. E. standards, including the horsepower formula. All the data obtained in the A. L. A. M. laboratory now is the possession of the society.

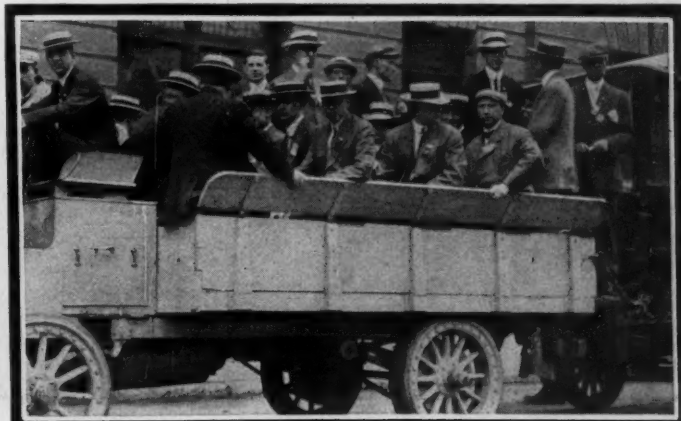
One epoch-making feature of the session was the appearance of the S. A. E. handbook, which is filled with engineering standards and data sheets. This is one of the most valuable books in existence in America for motor car engineers, draftsmen, purchasing departments, etc. The handbook is a loose-leaf volume and ar-



ELWOOD HAYNES ON RIGHT DISCUSSES ROTARY VALVE ENGINES WITH PRESIDENT HENRY SOUTHER OF SOCIETY OF AUTOMOBILE ENGINEERS

rangements are made for adding additional data from time to time, as recommended by the various standard committees of the society and passed upon at the general meeting.

President Souther read a communication from the federal government at Washington, D. C., in which it asked the S. A. E. to take up the matter of rational taxation



AT THE ENGINEER'S CONVENTION
TWO GROUPS OF ENGINEERS ON TRUCKS BOUND FOR THE FIELD DAY EXERCISE SATURDAY



THURSDAY AFTERNOON THE ENGINEERS FORGOT MOTOR CARS AND TOOK TO THE WRIGHT AVIATION CAMP, 12 MILES OUT OF DAYTON.

of motor and horse vehicles for road traffic. The government asked for a suitable formula to cover this. So important is this matter of road taxation by horsepower, weight or other means, that the S. A. E. will appoint a special committee to investigate and report back at the winter session next January in New York.

Much valuable progress was made in the matter of establishing new standards, as recommended by the different standard committees. A report of the standard committee from the iron and steel division was accepted. This report contains twenty-three specifications of steels suitable for motor cars, grey iron castings, malleable castings, steel castings, valve metals, and in addition directions for the heat treatment of the different steels, together with definitions and notes. There was much discussion by the steel manufacturers and many recommendations were suggested, but it was finally voted to accept the report as submitted. The work of the subcommittee will be continued.

The report of the standard committee on aluminum and copper alloys was ac-

cepted without discussion. This report will be published in detail at a later date in Motor Age.

The standard committee on motor car nomenclature reported progress, but the report submitted was referred back with instructions to complete the work still further.

Poor progress was reported by the standard committee on standardizing frame sections for motor cars. There seemed to be difficulty in getting the different frame makers to agree on standards. The committee's report was not accepted, but referred back for further investigation.

Much discussion was provoked by the report of the standards carbureter division. It seems that many of the carbureter manufacturers have not responded to the requests for co-operation by the committee, with the result that when a report was submitted the representatives of the carbureter field objected to the size of the intake flanges where the carbureter is attached. On motion the report was accepted, it being understood that the flange standards of the report are to

apply to new models of motors and carbureters, and that the report is not retroactive.

Continued discussion followed the reading of the report on the broaches division. Although the committee had compiled a vast amount of valuable information, there seems to be much uncertainty as to the number of splines best suited for shafts and gearboxes, etc. Some members were for four, some for six, and some for seven. There also was much difference of opinion regarding the surfaces to be ground. The report was referred back.

The fate of the broaches standard committee was followed by the committee on the standardizing of ball and roller bearings. The members of the S. A. E. were not settled on the amount of tolerance that should be allowed for the balls in the races and also between the shaft and the inner race, and between the outer race and the casting supporting it. The report was referred back.

A like fate awaited the report of the standards committee on springs for motor cars. The report submitted was severely criticized, on the ground that it was not sufficiently illustrated to make it of value and that there were many points of importance on springs specifications not included.

The standards committee on wheel dimensions for solid tires for commercial



THE SPEEDWELL AND OTHER LOCAL COMPANIES LOANED 3-TON TRUCKS TO CONVEY THE ENGINEERS FROM PLACE TO PLACE DURING THE 3-DAY SESSION AND THE RIDE WAS ENJOYED BY ALL

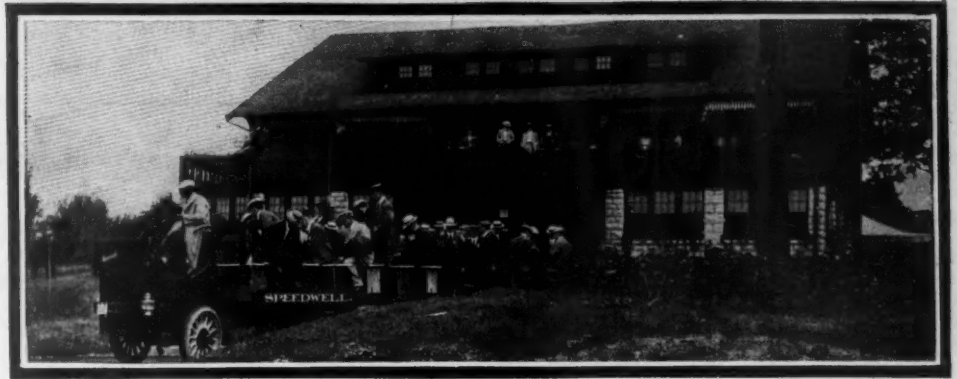


W. P. KENNEDY READ A PAPER ON SALESMANSHIP OF TRUCKS THAT CREATED GENERAL DISCUSSION

vehicle use submitted its report, giving the tire size, felloe depth, and other standard measurements necessary, together with the tolerances allowable. This report was accepted.

The present session of the society was characterized by the few numbers of professional papers read. This was looked upon as an advantage by a majority of the engineers present. In all, eight papers were presented, and the tedious task of listening to these being read was eliminated.

1—Oversize Standard for Piston and Rings, by James M. Heald. This paper was a dissertation on the question of car manufacturers boring out cylinders after they had been worn, and fitting pistons and rings of larger size, thereby constituting to all intents and purposes a new motor series. The discussion developed that in every factory there are several cylinder castings spoiled by being made over size, and that with many manufacturers the practice is to save these oversize cylinders and bring them through at the end of the season as a separate series, made with a certain oversize. This oversize might go up in steps of .005 each time. Mr. Heald in his paper claimed that in regrinding cylinders there are very few will clean out with less than .0012 inch of stock removed; and when the scoring is deep it is sometimes necessary to re-



A GROUP OF MEMBERS OF THE SOCIETY OF AUTOMOBILE ENGINEERS AT THE HOME OF THE DAYTON AUTOMOBILE COUNTRY CLUB

move .025, .030, or even .040 inch, before a satisfactory surface is obtained. From this he contended that two oversize standards should be decided upon, the first to be .015 inch oversize and the second .035 or .040 inch oversize. At the conclusion of the discussion it was moved and seconded that this question of oversize standards for pistons and rings be referred to a special standards committee, with instructions to report at the next meeting of the society, the aim being to enable a car owner to have his cylinders reground and to obtain new pistons without delay.

2—Some Points on the Design of Aluminum Castings, by H. W. Gillette—The speaker passed through the audience different samples of aluminum castings which illustrated the point to be made in the paper, namely, that the motor car engineer should consult with the foundries on the suitability of different castings before finally passing upon them as a part of the car. Frequently the car engineer is not familiar with the difficulties of the foundry man and his blue prints call for castings which not only are difficult to make, but are inherently bad, due to ex-

ceptionally thick parts of the casting being adjacent to very thin portions, the result being the casting soon cracks, due to expansion or contraction strain. The ideal casting is one of as near uniform thickness of metal as conditions will permit them.

3—Rotary Valve Gasoline Motor, by C. E. Mead—This paper is printed on pages 16 and 17 of this issue of Motor Age.

4—Question of Long Vs. Short-Stroke Gasoline Engines, by Justus B. Entz—It was brought out in the paper that in a gas engine operated at 1,000 revolutions per minute a $4\frac{1}{2}$ by $4\frac{1}{2}$ -inch motor will give equal power with a 4 by $5\frac{3}{4}$ -inch size. The long-stroke motor has a higher mechanical efficiency, is lighter, and operating at a higher speed its balance is equally as good as that of the short-stroke engine. As the area of the compression space is less in the long-stroke motor its thermal efficiency is higher, and also its mechanical efficiency higher.

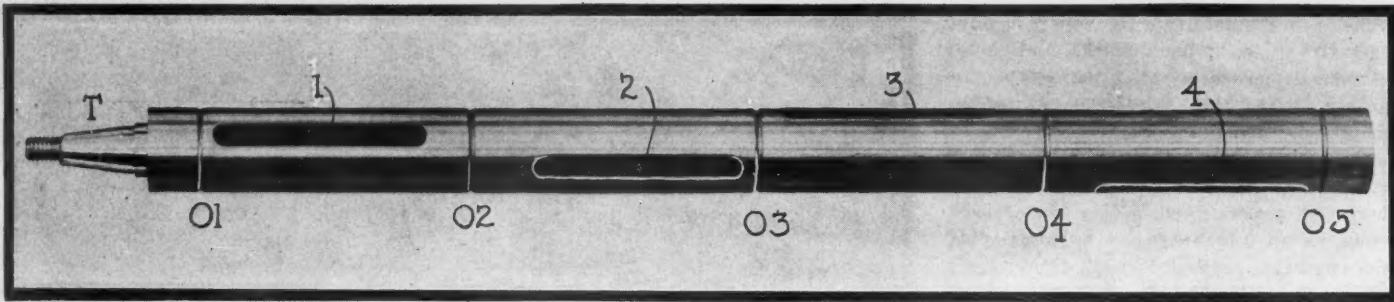
5—Worm Gear as Applying to Motor-Driven Vehicles, by E. R. Whitney—The paper devoted much time to the efficiency of the worm for factory and other uses,



DESIGNER FERGUSSON OF THE PIERCE-ARROW WAS AN ACTIVE MEMBER IN THE S. A. E. DISCUSSIONS



MUCH INTEREST WAS CREATED THROUGHOUT DAYTON BY THE TRUCK LOADS OF ENGINEERS WHO WERE CONSTANTLY MOVING FROM PLACE TO PLACE DURING THE 3-DAY SESSION OF THE SOCIETY



MEAD ROTARY-VALVE WITH PORTS 1, 2, 3, 4, AND OIL GROOVES 01, 02, 03, 04 AND 05

but took the stand that it was not as valuable for pleasure and commercial trucks as other means of drive. The discussion on this paper was particularly interesting, but was characterized by a great lack of accurate data. It was generally conceded that the worm drive has popularized itself in Europe because of its quietness, the rear axle with worm drive being noiseless as compared with the humming so characteristic of the bevel drive axle. It was brought out that one objection of the worm-driven axle for pleasure cars in America would be the reduced clearance, the worm having to be mounted beneath the axle. This reduction of clearance is not a factor in Europe, where good roads are everywhere. In the application of the worm drive for commercial vehicles, it was pointed out that it is particularly applicable for this work in that it allows for a reduction of ratio of 8 to 1 between the motor and rear wheels at the rear axle. Such a reduction as this is impossible with double gears unless a reduction through spur gears is used, in addition to that between the bevels, which means a loss of efficiency. It was pointed out that the worm gives an efficiency of 95 per cent or over.

6—Administrative Engineering and Salesmanship in the Commercial Field, by William P. Kennedy—In his paper Mr. Kennedy brought out the necessity of an engineering executive in selling of commercial vehicles, whose duty it was to serve as a come-between to co-operate with the salesmen in giving him technical information necessary in the selling of commercial cars and also furnishing the engineering department of the factory with the necessary data to meet the requirements of the truck in the different industrial fields. The paper was one of the most valuable of the session and will be published in detail at a later issue.

7—Long Addendum Gears, by E. W. Weaver.—This was a specially technical paper on the construction of gears with what is known as the long addendum tooth. The word addendum meaning face, as applied to the gear tooth. The paper will be published in a later issue of Motor Age.

8—Elements of Ball and Roller Bearing Design, by Arnold C. Koenig.—As the subject suggests, this paper took up the complete details of bearing design from an engineering standpoint and will be printed in these columns later.

30 pounds to the square inch. Engines lubricated in this way endure.

“With the longer-stroke engine balancing is the great problem; that is, balancing the camshaft, flywheel and reciprocating units. There are two solutions of this balancing problem. The first is to use light reciprocating parts, such as pistons and connecting rods, and look after the careful rotational balance of the crankshaft and the flywheel and clutch. The second solution is the use of small six-cylinder models in which it is possible to get all parts well worked out.

“The balancing problem is the greatest argument against the use of ball bearings for the crankshaft. The ball bearing does not give sufficient crankshaft rigidity, due to the small surface of the balls which contacts with and takes the weight of the crankshaft.

“The two-cycle engine is coming to the front very rapidly in Europe. The big question is whether the two-cycle engine or the four-cycle, with the rotary or slide valve, will win out. The rotary valve is the real solution of the four-cycle engine and, while we cannot look for a complete solution for some time, all efforts are working along the right line and results will be forthcoming. The two-cycle engine has been built in many forms, particularly for boats in America. In Europe the pump type of two-cycle has had a big demand. In this a pump of one form or another is used to insure a full charge of the combustion chamber with fresh mixture. This is very essential. The New Engine Co. in England has a two-cycle engine that is very flexible. The Lucas engine is also quite flexible. It uses a common combustion chamber for the two vertical cylinders. Popular prejudice has been very strong against two-cycle engines and has retarded their development.

“The question of transmissions and axles is a very live one. England is almost crazy on quietness and quiet gears are expensive. If you have to get quiet spur gears you have got to grind them, and this grinding will have to be as accurate as in a ball bearing. The same applies to bevel gears. The difficulty with gears is that it is so difficult to prevent their warping after casehardening.

“Because of the noise troubles in gears the silent chain is certain to come into use in gearboxes. This is at present used

Compares American and English Cars

Editor's Note—Address of A. Ludlow Clayden, Editorial Staff Automobile Engineer, London, Eng., before the Society of Automobile Engineers, at Dayton, O., June 17.

IN comparing the English motor car with the American car there are some differences. The first difference is due to conditions of temperature. This is not very much, but has an effect on car construction; it does not, however, effect the big features of design.

“The small-bore-long-stroke engine so suitable in England is equally suitable here. It is lighter than the short-stroke-large-bore types and so is more suited to rough American roads.

“Regarding the stroke-bore ratio, England has many cars with a 1.5 ratio; that is, in which the stroke is one-half longer than the bore, an example being 4-inch bore and 6-inch stroke. There are many cars with a 1.2 ratio, but after studying the entire field I think the most suitable and final ratio will be 1.75, an example of

it being 4-inch bore and 7-inch stroke.

“The crankshaft speed of these larger-bore motors often is very high. The Sunbeam motor, 80 millimeter bore and 120 millimeter stroke, is as high as 3,800 revolutions per minute. This motor has large-diameter valves, being more than one-half the cylinder diameter.

“Perhaps the greatest difficulty with the longer-stroke motors is that of lubrication. The ordinary splash system is quite out of the question. The controlled splash system, in which there are dippers on the lower end of the connecting rods and which dippers cut into oil in troughs which can be raised or lowered to give more or less oil, according to requirements, is very satisfactory for medium crankshaft and piston speeds. The forced feed system is, however, best. By forced feed is meant feeding to the crankshaft and lower connecting rod bearings under pressure. In the Lanchester cars the oil is fed to these bearings at a pressure of

in the Vanguard and General omnibuses in London. They give chain transmission on low and intermediate. Reverse is through gears. The big reason for silent chains in gearboxes is the ignorant driver. With a silent chain gearbox the worst you can do is break a chain, and to repair or replace it is much cheaper than to get a new spur gear and install it. The chain can be replaced in a few minutes. The General Omnibus Co. claims that it saves thousands of dollars annually by reduction of cost in replacing silent chains instead of gears. English engineers are at present discussing the question of frame rigidity. The rigidity of a frame cannot continue. You have only to watch a car body on a rough road to understand this. The rigid frame has given rise to a great deal of body trouble in Europe and you can look for it here. We must allow for greater frame flexibility, and chiefly in heavy trucks.

"Another point that interests me very much is why in America both emergency and service brakes are on the rear wheels. The external rear wheel brake has many disadvantages, one being that it gets very dirty and clogs with mud. The internal rear wheel brake can also clog unless well protected. What surprises me most is the entire absence of the gearbox or transmission brake. In England we can use it when it is not safe to use the rear wheel brakes. This is on hard, greasy macadam. We know that the transmission brake puts a lot of strain on the gearset, but in Europe this has not caused much trouble. Front wheel brakes have an advantage of pulling straight if not applied too hard, but if they lock the front wheels the skid is much worse than with rear wheel brakes. The best results have been obtained from a set of four brakes operating on all four wheels at once; with these you simply cannot skid. You do not skid if the brakes are applied on diagonal wheels; that is, the left front and right rear, or right front and left rear. I am much interested in the American factory system of employing a chief engineer who acts as an advisory committee on construction. This is a very efficient system, and leaves the engineer free to go ahead on the design of new models. Once a car design is perfected for that year, much of his responsibility is removed, whereas in England there are many factories with engineers over the different departments, and their time is largely consumed caring for the departments.

"Repair experience is very valuable for engineers, and some of the best English engineers began as garage repairmen. They gained by experience with the failures of others. These men saw at the bench what was best or worst in the other cars and profited thereby. Every designer should work for 6 weeks each year in a repair shop.

"One mistake English makers have made and that is putting down such contests

as hill-climbs, reliability runs and track or speedway races. This has been a mistake. They thought contests did not pay. They know different now. Contests are the best possible means of developing cars and getting the efficiency of today. You learn more in a week of competitive test than in a year of your own trials. Even to fail badly in a test is worth more than all of the bad advertisement you get. I have often seen men cured of pig-headed ideas by defeat in contests.

"The subject of wire wheels is a delicate one. The American hickory for wheels is much superior to the English hickory and so the artillery wheel is better in America than in Europe. The wire wheel is stronger and more durable

than an artillery wood wheel, I think.

"Regarding slide-valve motors, the only one I know well is the Daimler-Knight. It is a very good one. I do not say that it is the best, or that what it accomplishes cannot be done in some other way. The aim is to get as wide a fuel opening as possible and also to keep it open as long as possible. The same applies to the exhaust. I do not think that any special type of engine will prove best. They all have good points. Puppet-valve types, slide-valve types and rotary-valve types will all live. The type selected is largely a personal matter with the maker. The great advantage of the sleeve-valve is that if started right it keeps right and goes well."

Mead Rotary-Valve Motor Introduced

THE continued popularity of the slide-valve motor in Europe and the phenomenal activity in connection with every kind of valve, with the exception of the poppet valve, has aroused continued interest in America in motor improvement. Among the first tangible examples of this is the Mead rotary-valve engine, manufactured by the Mead Engine Co., Dayton, O., which company built its first motor over a year ago and has driven it in a car over 18,000 miles. In addition to this the company has built half a dozen other motors which have seen varied service.

This motor made its official debut in connection with the session of the Society of Automobile Engineers at Dayton, O., last week, where a paper was read outlining the motor and giving its general specifications. On these pages its details

are illustrated. The general scheme of the rotary valve is shown in Fig. 2, which is a vertical end section of one cylinder, the four cylinders in the motor being cast en bloc. This motor has two rotary valves, one V on the intake side, and a similar one E on the exhaust side. Each valve is a cast iron bar with four slots cut through it at the proper angles to serve as the four intake valves, and similar slots to serve as exhaust valves. Each valve is driven at one-quarter crankshaft speed by means of a vertical shaft, at the front end of the engine, as illustrated at S in Fig. 4. This shaft takes its drive by bevels B from the crankshaft and carries a worm S on its upper end which meshes with two gears, one on the front end of each valve. As Fig. 2 shows these valves are waterjacketed by the space JI above, by the space J underneath, and also by a third space J2. Each valve is lubricated at five points by oil leads L, the oil being forced under pressure to the valve at these points.

The motor used has 4-inch bore and 4½-inch stroke. On this the intake valve opening or port is 3¼ inches long, and ⅞-inch high, being a rectangular opening. The rotary valve governing this port has a diameter of 1½ inch. The exhaust valve opening is not so large, being a rectangular port 3¼ inch by ⅞ inch. Roughly speaking, the timing is arranged so that the intake opening is 5 to 10 degrees late or after top dead center and remains open until 29 to 30 degrees past the lower dead center. The exhaust valve is set to open 60 to 68 degrees before bottom dead center and closes on the top dead center or 5 degrees after. Generally speaking, if the exhaust closes on top dead center, the intake opens 5 degrees later, and if the exhaust is set to close 5 degrees after top dead center the intake opens 10 degrees later, or 5 degrees after the exhaust closes. It is stated that for low-speed work, which is 300 to 500 revolutions per minute, best results are obtained by having the exhaust close on top head center and the in-

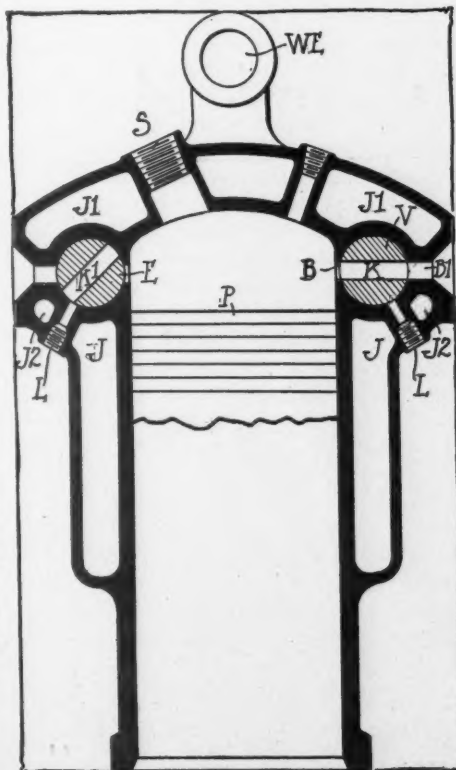


FIG. 2—MEAD ROTARY-VALVE MOTOR

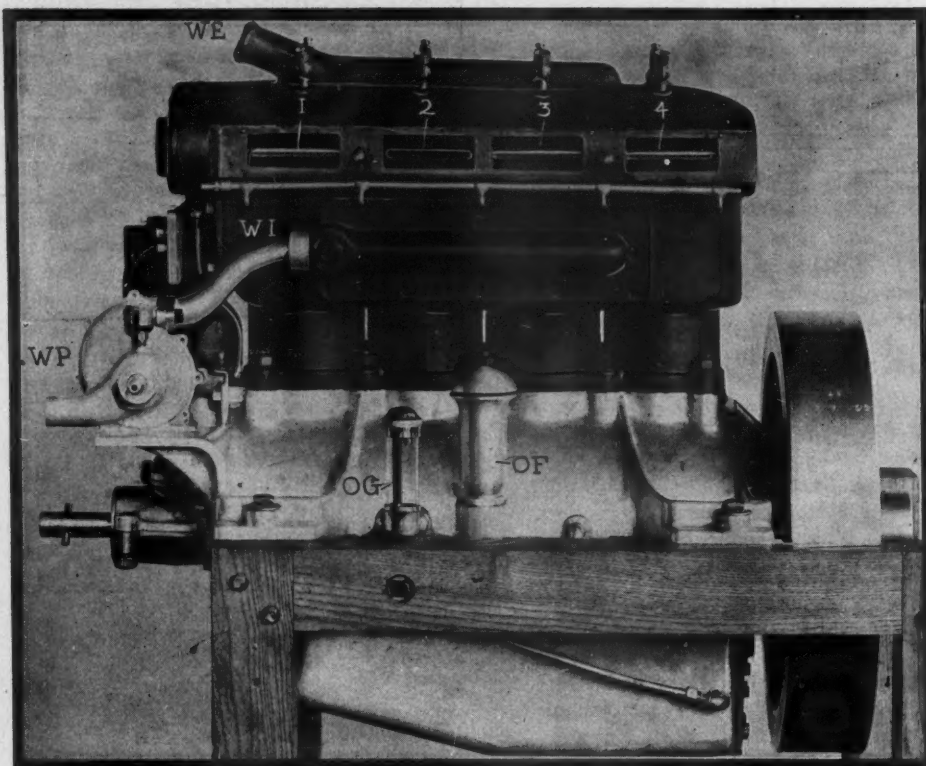


FIG. 3—MEAD ROTARY-VALVE MOTOR; 1, 2, 3, 4, PORTS IN VALVE; OG, OIL GAUGE; OF, OIL FILLER; WP, WATER PUMP; WE, WATER EXIT; WI, WATER INTAKE

take open 5 degrees later. Both intake and exhaust valves are made in a clearance of .0015-inch clearance at the bearings and .002-inch clearance where the ports are cut in the valve.

Cyrus Mead's Paper

The following paper by Cyrus E. Mead, inventor of the motor was read before the engineers at their Dayton session last week:

The poppet-valve motor has been brought to a remarkable state of perfection. It has taken years of experience to do it, and much engineering knowledge has gone into the investigation of this type of valve. As good as it is, it must be admitted that it is not yet perfect and that there is room for improvement in poppet-valve motors and room for a type of valve that will be better in every way.

Such improved type of valve must be simpler than the poppet type; must not be more expensive to manufacture, and must be capable of such construction as to permit of proper timing, ample openings into the explosion chamber and be perfectly quiet in operation.

Some years ago the need of such a valve attracted my attention. The art was searched for information. Some information existed, but it was of rather an inferior character. Rotary valves had been proposed with both inlet and exhaust ports in the same valve. Oscillating valves of various characters had been tried. The single rotary valve looked the best to me and was tried. A four-cylinder, air-cooled motor was equipped and run in an experimental manner. The construction functioned fairly well but it did not permit

of close regulation under all conditions.

It is unnecessary to state to motor car engineers, perhaps, that any valve for motor car use must be capable of close regulation at all speeds under light explosive charges and under heavy explosive charges, at high speeds and at low speeds.

Some faults of regulation were developed with the single rotary valve. There seemed to be some interconnection between exhaust and inlet gases because of the necessary proximity of the valve ports; at least, only such an explanation seemed to account for the irregularity of slow speed firing that was experienced.

There was also some difficulty of unequal expansion, due to hot gases and cold gases alternately passing through the same valve in close proximity. Investigation indicated that a single valve would probably not fully answer the purpose of motor car usage. With this as a starting point, two entirely independent rotating valves, with through ports, were considered. The result was surprisingly good, and the first engine of this type built ran in a 2,500-pound car some 18,000 miles before giving way to an engine of later model, of similar design, and being laid upon the shelf.

The valves themselves were made of ordinary gray cast iron, similar to that used for the cylinder castings. Other materials may be discovered that will do better work, but it is a fact that the cast iron valve is entirely satisfactory. The only precaution necessary to be taken is to anneal the iron in such a manner as to relieve all casting strains that might otherwise be relieved by the heat of the gases and cause warping in the valve and resulting binding in the bearings. Fig. 1 illustrates this valve.

It is a true cylinder throughout its entire length and fits the hole within which it rotates with a clearance of .0015 inch at the five bearing points and about .0005 inch more clearance in the zone opposite the port opening. Oil grooves are shown in the illustration. It has since been found that these may be omitted entirely.

The manufacture of the valve is simple. A slotting milling machine will produce the port openings, which, of course, may be easily and correctly indexed to the proper angles. In the end of the cast iron valve is screwed and pinned a steel stud or shaft upon which is mounted the valve driving gear. The construction indicated has been fully tried and serves the purpose. Other obvious constructions may be used. This construction does show, however, that the drag on the valve must be very slight. A gear is driven onto the taper, and a nut and lockwasher hold it in place. A set-screw through the hub of the gear bears against the taper shaft and assists in keeping the gear from rotating on the shaft. Were the strain very severe this construction would never answer the purpose.

Further indication of the small amount of drag or friction is given by the fact that the first engine constructed was put up with a spiral cast-iron driving gear on the crankshaft. This was used because found on hand, and was sixteen pitch. After the entire life of the motor, about 18,000 miles, this cast-iron gear was still in good condition.

Two Motor Types Tried

Altogether there have been seven motors fully tried out. All but one are 4-inch by 4½-inch, and that one is 5-inch by 5½-inch. The oldest is 15 months old, one is 10 months and two are 8 or 9 months old, and the others have been used about 2,000 miles in cars. There is no evidence of wear that can be detected by ordinary micrometer measurement. The holes in which the valves operate are polished by use and have very much the same appearance as the cylinder walls, a smooth dull polish. The metal of the valves themselves shows only the discoloration due to the oil caked onto surfaces that do not rub. If this oil, so adhering, be rubbed off, the metal is found to be without signs of wear. To illustrate this point, one exhaust valve was purposely badly scored by grinding wheel and file and then put into service. The depressions all filled up with a hard, glossy, oily and carbonaceous substance. In no instance was the scoring the source of trouble, and the micrometer indicated that the valve had built up to a true cylinder.

So far, the boring of the valve hole has been done by a boring mill and a long reamer with no further treatment whatever. So long as the hole is true and the valve ground straight, there is no indication that there is any cutting or leakage. A heavy oil holds compression for some time. A light oil permits of

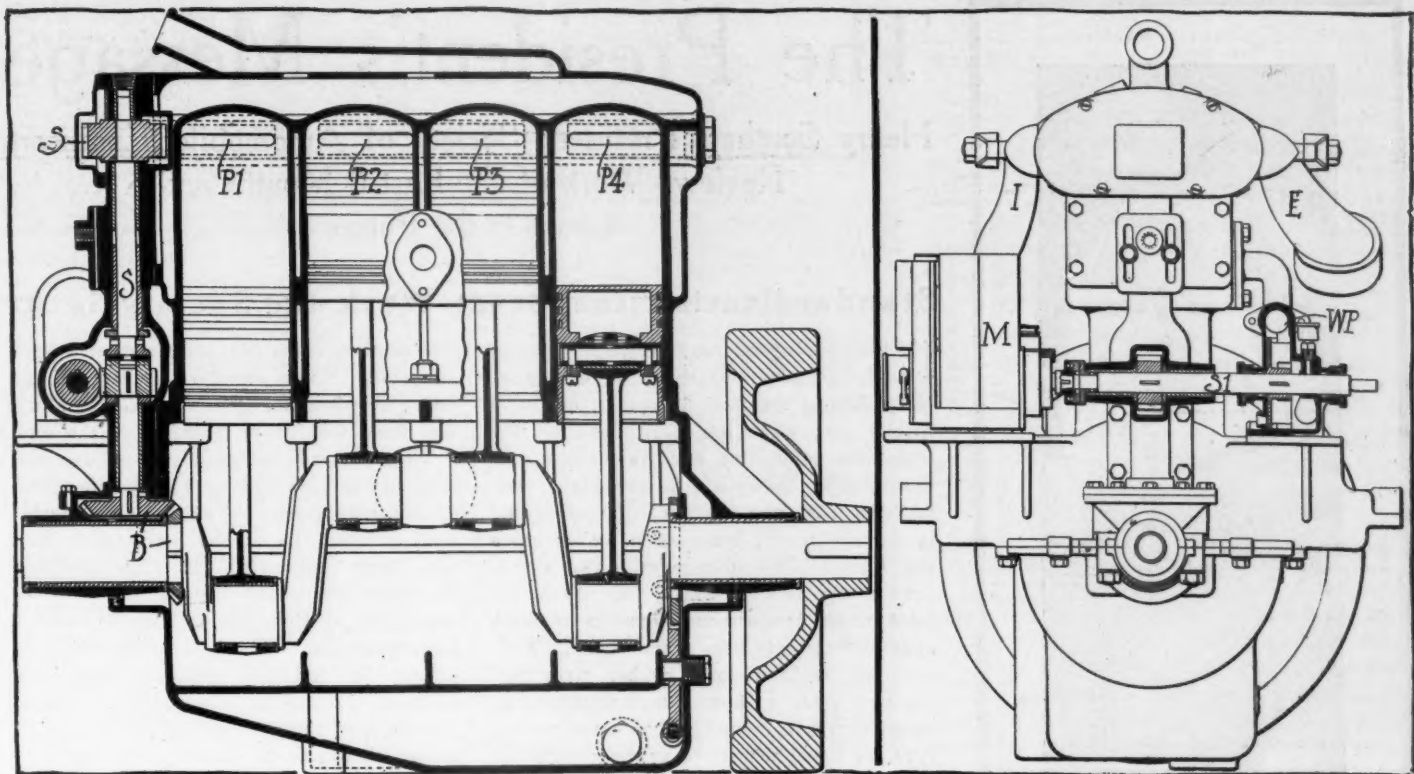


FIG. 4—SIDE VERTICAL SECTION AND END ELEVATION OF MEAD MOTOR

slow leakage of compressions, but never enough to affect the horsepower or torque of the engine at normal engine speeds. Some suggestions have been made that special bearings for the valve might be desirable.

The Valve Dimensions

All but one of the engines have been 4-inch bore by $4\frac{1}{2}$ -inch stroke, and the valves for it have been $1\frac{1}{8}$ -inch diameter. The recent engines have had exhaust port openings about $\frac{3}{8}$ -inch wide and nearly as long as the bore of the motor. The inlet valve is of the same diameter but with slots somewhat narrower.

A $\frac{1}{8}$ -inch wide inlet valve slot gives timing about as follows: The valve begins to open at about 10 degrees past upper dead center. This brings the closing about 40 degrees after lower dead center, remaining open 260 degrees.

With $\frac{3}{8}$ -inch wide slot and valve closing at upper dead center, the exhaust begins to open at about 73 degrees ahead of lower dead center.

Exhaust Valve Behavior

The outgoing gases are very hot, but as the valve is exposed to an even degree of heat there are no injurious inequalities. The valve is in close contact with the waterjacket, rotates slowly and uniformly and is thoroughly cooled. There is none of the discoloration, scaling or blackening always found in connection with an exhaust poppet valve. In other words, it is evident that the temperature is never sufficiently high in the rotary valve to scale, blacken or discolor the cast-iron. With 1,000 feet per minute piston speed on a 4-inch by $4\frac{1}{2}$ -inch engine developing 31-32 horsepower, the exhaust valve was the same in appearance after

a 6-hour test as at the commencement, and had a slight film of oil distributed over its entire length.

The advantages of the twin rotary valve over the simplest form of poppet are numerous and important. Simplicity of design affecting casting of cylinders and crankcase; diminishing the number of parts by elimination of poppets with valve cans, push rods, cam rolls, cams, cam-

shafts, springs and other smaller details; silence due to entire absence of any striking parts, like valves on seats, and push rods on cams; uniform rotation, without intermittent strains as found with all cam-operated valves. Absence of all gear noises in connection with the operation of valves, for the same reason; These are only a few claimed advantages for this type of motor.

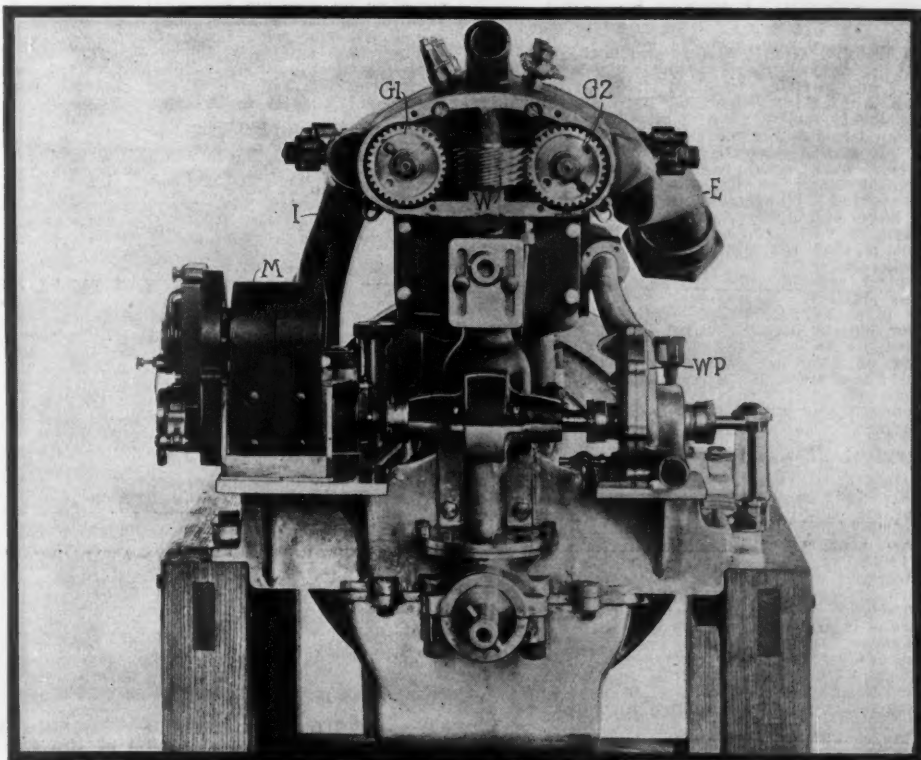


FIG. 5—MEAD ROTARY-VALVE MOTOR: G1 AND G2, GEARS ON ENDS OF ROTARY VALVES DRIVEN BY WORM W; E, EXHAUST MANIFOLD; I, INTAKE MANIFOLD; WP, WATER PUMP; AND M, MAGNETO

The President's Message

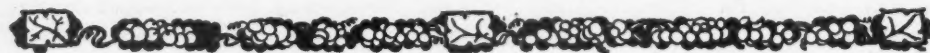
Henry Souther, President Society of Automobile Engineers
Reviews Work of the Last 6 Months and
Looks to the Future

Standardization the Great Work the Society Is At

IN his opening address President Souther reviewed generally the work of the society during the past 6 months, outlining briefly just what has been done by the standards committee and its various subcommittees. Some of the standards committees made one mistake, that of trying to do too much, whereas in other cases the results are too meager. The standards committee on wheel dimensions for solid tires found conditions in a most chaotic state when its work began. Each company making solid rubber tires had its own tools and moulds, and the consumer or truck owner had to carry twelve types of wood wheels to accommodate the different tires and fasteners. This could not exist and many of the big consumers threatened to make their own wheels and insist on the tire makers coming to their requirements. This would have resulted in an even greater chaotic state.

The final result is that standards will have to come. These standards will cost the tire and wheel makers much at the start, but they will prove cheaper in the end.

The standards subcommittee on iron and steel has had its labors. The specifications of different grades of steels, on a chemical analysis basis had been completed and were submitted at this meeting. To these are added instructions on heat treatment of them, as well as definitions and terms used. The heat treatment data cannot be followed without exceptions, because pyrometers do not all read alike, the shape of the piece of metal undergoing treatment has to do with it, ovens are also different. This heat treating data has nothing to do with the specifications when it comes to the purchasing agents using the specifications as guides to the purchase of different car steels. These specifications are most valuable.



something about it; and it is also a fact that the experience of a consumer teaches him something about a given commodity that even the producer may not know. If both of these elements were frank and honest and laid all of their knowledge on the table, then there could be no question but what the finding of such a committee would result in something fair to all concerned.

The chief trouble seems to be that either one side or the other withholds certain bits of information and the results of their work are proportionately imperfect.

Selfishness Should Cease

The old-fashioned practice of wrapping a given process up in mystery or surrounding it with a halo of secrecy still persists. Trade secrets still exist and petty jealousies still continue, and all these prevent frankness and the accumulation of complete committee knowledge. It is not fair to ask that all trade secrets be laid before committees, nor is it necessary that the trade secret should be exposed in order to give sufficient knowledge to a committee to enable it to proceed intelligently. It is fair to ask that all personal feeling and all trade jealousy be laid aside for the benefit of all concerned.

The work of the standards committee has developed one thing that was somewhat expected, and that is the danger of attempting to standardize too many things. One or two committees have run into this, have seen the danger of it and have properly checked the desire to do a great deal. They have presented reports which may seem meager for the amount of time put upon the work. It is my opinion that these committees have shown great wisdom and that there is less danger from reporting a little that is valuable than from reporting much, of which only a part is reliable and likely to become a practical standard.

Wheel Fastenings Troublesome

This division had for a problem what was apparently about as difficult a one as could be imagined. At the outset it seemed as though it would be impossible to bring together and unify the different interests involved. Each tire company had a special form of tire and fastening which it had worked out without any regard for any other tire or any other company. The condition was chaotic.

It must be remembered that each company, therefore, had its own special and expensive

collection of tools and molds, worth several thousand dollars, and that to change meant the destruction of what they had and added complications. It required a great deal of unselfishness for the producing companies to give up their own established standards. Nevertheless they did so and yielded to the reasonable demands of the consumer that something must be done. The work of the committee, once started, progressed very rapidly and the report laid before you is of great value.

The need of some action was quickly shown as soon as the committee work started. Requests and even demands came from truck builders and consumers of wheels and tires in general, that if something was not done immediately each consumer would adopt his own standard and refuse to depart from it. The consumer had found that he was called upon to carry in stock a dozen sizes of wood wheels and a corresponding number of tires, and that the delay and expense were simply unbearable. The producer and consumer got together and the result is found in the report of your committee.

To adopt the standard set forth will cost a great deal of money at the outset, but will save the industry as a whole many times the amount of the original cost.

The Handbook Started

It is one thing to collect a large amount of available information and quite another matter to put it into such shape as to make it instantly available. With this idea in mind the council of your society places before you today the S. A. E. Handbook, the beginning of what ought to be a most acceptable book to every man engaged in our industry. So far it is made up of much that has been printed before in the way of useful tables, formulae and data in general. To this will be added, as fast as approved by this society, the information resulting from the work of our committees and approved contributions by S. A. E. members.

In it will be printed standard specifications for materials as fast as adopted and information as to the treatment of materials and the methods of testing them, and much in the nature of instruction.

All of this, concentrated in a handbook, should be found in every drafting room and on every engineer's desk. The information will point the way to many short cuts and save much valuable time. Engineering pub-



PRESIDENT HENRY SOUTHER

AS THE WORK of this standard committee progresses there is developing a group of our members who are rising to the occasion and who are working hard and working unselfishly for the good of all. The larger this group becomes the more rapidly will the work of our standards committee progress.

Our work must be thorough and of the highest class, or the results of it will be short-lived. The fundamental idea of having a large standards committee and having its members vote upon reports of its subcommittees is that the work may be upon a broad basis and have all of the necessary checks applied that are so necessary in all important matters. It has been felt that in order to have the proceedings of this society what they should be, the work should be so outlined as to bring about thorough consideration of all the subjects in hand and give the whole membership frequent opportunity to comment and criticize. A practical, useful standard is sought and not an academic standard.

Survival of the Fittest

Only those standards can survive which are believed in and endorsed by all concerned; and unless all concerned have had an opportunity to criticize and to approve, any proposed standard will be less effective.

It is a sad fact that selfishness always has interfered and probably always will interfere with the evolution and final adoption of a standard. The rivalry existing among producers is allowed to interfere with the real judgment of many of the representatives of the producers. Even the personal element is injected and is allowed to interfere with progress in this direction. If these human obstacles could be eliminated, progress would be far more rapid.

My opinion is that all the knowledge available on any given subject should be placed before the committee interested, in order that the deliberations of that committee may be thorough. It is beyond argument that the producer of a given commodity must know

lications and the scattered notes of many men may include much of this information, but it is not in such shape that it may be instantly laid before a young engineer so that he may proceed about a given problem without the necessity of spending much time in looking for the information in order to carry out the ideas of his superior. It is much easier to lay before a draftsman standard figures relating to a subject than to sit down with him at the drafting board and make sketches and notes of details. The other alternative is to let him exercise his own ingenuity, and that has been done times enough already, to the cost and confusion of the industry.

Sheet Steel Division

This report of the sheet steel division, incomplete as it is, is valuable. Much progress has been made and incidentally the work of some of the 100 committeemen has stirred up an old question that has been worrying the world for many decades, namely, the finding and adoption of a metal gauge; that is, a means of calling by name certain thicknesses of metal, whether in sheet, wire or tubular form. There exists in widespread use six systems of gauges and several others are used to some extent. There is a general recognition of the necessity of a gauge rather than of naming of thickness by inches or fractions thereof. Those deeply in the rut in the use of gauges cannot conceive of any means of getting away from such use. They see complication rather than simplicity, if gauges are abandoned, and state that were gauges abandoned, the number of different thicknesses called for would increase and that the number of dies or rolls or mandrels necessary to produce wires, sheets or tubes would increase enormously.

Standard Gauges Wanted

The thought occurs, after reading the voluminous correspondence relating to the committee work, that an adoption of standard difference between thicknesses might eliminate the necessity for a gauge.

Material ordered not conforming to these differences would then be special material, not of standard thickness, and therefore of special price. There seems to be no good reason why .001 inch should not be the basis of all measurements relating to the thickness of sheets, wire or tubular metal. It might be necessary to refer nine hundred thousandths at the other extreme, but this would be the exception rather than the rule and little hardship even at that.

It is a fact that the gauges in common use are founded on different principles; one, for example, especially for metals like copper, brass and the like; another, based upon the weight of a given area of sheet metal, and another upon measurement in fractions of an inch. There seems to be no good reason why one system of measurement or gauge, if a gauge be necessary, should not apply to all kinds of metal, whether copper, aluminum, iron or steel, in sheet, wire or tubular form.

In considering this whole subject one is led to the thought that all interests in the United States should be consulted; the engineering societies, the large manufacturers of wire and sheet metal, the large users of such materials and the government as an accepted authority

for all standards. No decision would be worth the paper it was written upon without the support of all these interests.

Then the thought naturally leads to the desirability of an international conference. There are various gauges peculiar to European countries; but one is immediately confronted by the metric system—the standard of Europe—and an international standard seems out of the question without the added complication of a table of equivalents; English to metric, inches to millimeters.

Our producers of metal are obliged to know the foreign gauges because they export much material to foreign markets. Consequently even though an American standard be adopted, it will be only an incomplete standard after all, not international.

In view of this and to get action it is my thought that all those in the United States interested should act, and should push to a point ready for adoption a system of naming thickness and that when such a system is agreed upon by all concerned the results be used to replace all other means of measurement where the English measure is standard.

International Gauges Best

This thought is advanced rather than attempting to start an international system in the belief that if some report on some standard be offered for adoption quicker action would be obtained than trying to get all concerned to move forward at the same time.

This work may be properly started by our society and when completed may then be properly placed before our United States government and the bureau of standards and by that bureau before the other interests involved in the United States. It is probable that some action could be obtained in a relatively short time by such a program and that little action will be obtained if an attempt be made to get all the interests involved to start together.

Membership Grows Fast

During the last summer meeting the membership of this society was 364. Today it is over 900, with many application blanks remaining to be acted upon. This is a growth that has never been equaled by any engineering society. But it is also a fact that the growth of the automobile industry has been more rapid than that of any other industry.

The question has been raised by some as to whether so rapid a growth could be a healthy one. It is the belief of your president that it is healthy and for the best interests of all concerned.

The motor car is a complex structure, made up of many different kinds of materials and accessories, which are worked by as many widely varying industries. It is a safe statement to make that no one engineer or expert understands fully all the details of all the industries engaged in the production of the car. Motor car engineers make drawings which indicate rubber tires, wood wheels, metal springs, ball and roller bearings, magnetos, radiators, wood bodies, upholstery, tops, glass fronts and lights, both gas and electric; but no engineer attempts to design or direct the manufacture of every one of these important elements of a car.

Consequently it seems necessary, for the

greatest good of all concerned, that the membership of this society should be made up of those familiar with every one of the details mentioned and many others not mentioned which enter into the make-up of a car.

Your committees would have been incomplete and could not have handled all the subjects that have been discussed had the membership been confined to the motor car engineer pure and simple. It has been necessary to call upon experts of the rubber works, steel works and other industries who are members.

It must be apparent to all who have observed the progress of this work that if the greatest good is to be done, it must be done by those of the various industries involved.

There is in the membership of this society those capable of dealing with engine problems, and it is their duty to come forward and write technical papers relating to that subject. There are those who are capable of telling us as to the details of magneto construction, of the difficulties which go hand in hand with the benefits of magneto ignition. It is their duty to come forward and write upon the subject for the benefit of all concerned. These two items of technical interest can only be furnished by those with deep engineering knowledge.

Much Information Is Needed

On the other hand, there are many of our members having good knowledge of shop management, of costs and labor saving devices. If they will write upon these subjects the whole industry will be benefited and such information is just as valuable in its own way as the more theoretical information of the electrician and motor engineer.

Without co-operation between engineering force and sales force the industry would soon come to a bad pass. The engineering force should study and write that which will be interesting to the sales force, and the sales force should, in turn, tell its side of the story to the engineers.

If the accessory manufacturer does not come forward and tell of his problems, then the engineer proper will go on designing motor cars upon which it is very difficult and costly to place the accessories which are to be used.

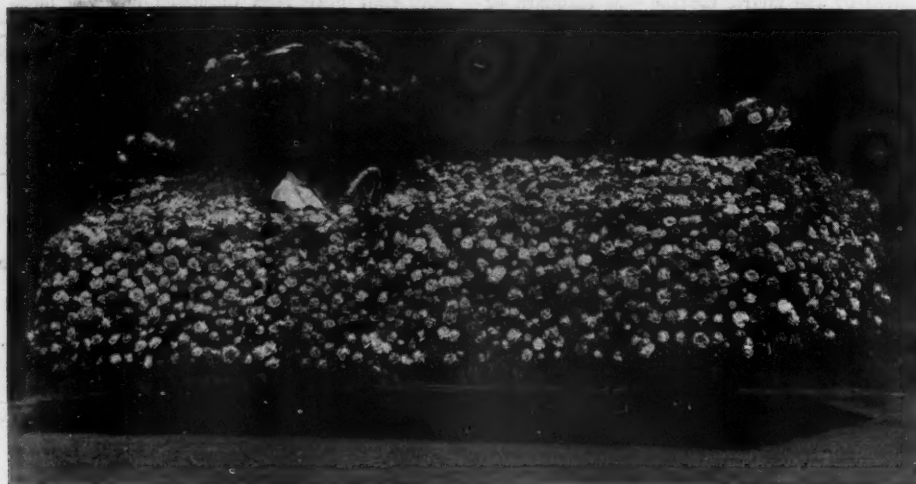
Let me urge that each member tell the society in one way or another, by some paper, letter or communication, some of the simple things he may know. Some of the simplest facts or bits of empirical knowledge and practical experience in the possession of those engaged in certain pursuits are absolutely unknown to those engaged in other and dissimilar pursuits, and yet such bits of information may be very acceptable. It is not always the deepest and most abstruse writings that do the most good. In fact, it is safe to say that many of the little practical points, often despised by the possessor of them, are of great value. Just because a member is not a scientist is no reason why he should not write. A feeling of this kind is too prevalent in all engineering societies.

Looking at the matter in this broad way, there can be no question about the necessity of bringing together in one organization like ours all the elements of the industry and it is to be hoped that those who have held other views may find reason to change them.



ENGINEERS VISIT THE PLANT OF THE NATIONAL CASH REGISTER CO.

Portland Parade a Marvel of Beauty



PORTLAND'S FLORAL PARADE—TWO THOUSAND FRESH ROSES DECORATED THIS CAR.

More than 500 Cars, Valued at \$1,000,000 and Decorated With Millions of Blossoms, Make Brave Showing in Oregon Metropolis—Packard Motor Truck Converted Into Battleship

PORTLAND, Ore., June 17—With more than \$1,000,000 worth of cars, buried beneath millions of rose blossoms and other flowers, with nearly 2,000 beautiful and handsomely-gowned women taking part, the annual festival parade of decorated motor cars was held in Portland on Wednesday, June 7, and passed into history as one of the greatest achievements ever undertaken anywhere or by any city since the industry was born. There were nearly 500 cars in line.

Among the finest of the entries was that of Frank C. Riggs, whose huge Packard truck had been converted into a battleship 60 feet in length, with all the equipment of a modern sea fighter. It bore four iron cannon, out of which belched volleys of roses and blooms, and mechanical effects gave the proper boom to the firing of the guns along the parade.

Another masterpiece was the picturesque entry of the E-M-F Co., which had built a huge locomotive of roses and ferns, followed by a tender and two cars, all of flowers and greens, and borne on a string of four E-M-F touring cars. John L. Hartman had converted his coupe into one of the trimmest little floral yachts that could be imagined.

O. K. Jeffery's car won the grand prize, while A. C. Callen was awarded first honors in the touring car class. Mr. Jeffery's car was artistically decorated in rhododendrons and roses, and in it were seated Mrs. Jeffery and daughter wearing dresses that matched the lovely flowers.

Many novelties were furnished in the class opened for various clubs and organizations. The Rotary Club was an easy winner. The rotary idea was carried out by a wheel within a wheel, the entire series of wheels revolving mystifyingly.

Honorable mention was given the Portland Railway, Light and Power Co. because of the extensive display made. Eleven touring cars were entered, carrying the officials of the company.

Columbia university had a float, in which a wise man and several owls, with other typical features, represented the seat of learning. The Pacific highway pathfinding car had a prominent position and attracted considerable attention on account of its good work recently in marking the highway.

The Gadsby prize for the all-rose exhibit went to Miss Hazel Fields, whose car was completely covered with pink roses. She was accompanied by her sister.

JOE RICE BEST GUESSER

Indianapolis, Ind., June 19—Although a heavy rainstorm made roads almost impassable on the return trip, the secret time run of the Indianapolis Automobile Trade Association Saturday and Sunday was a success nevertheless. The run was to French Lick and return and Joe Rice, driving an E-M-F car, was awarded the silver trophy offered by the Indianapolis News.

The only contest feature was that the car of any class finishing closest to the secret schedule of its class, should win the prize. Twenty of the twenty-three cars starting finished, although many occupants of the cars were obliged to return to Indianapolis from Bedford by train on account of rain.

There were three classes of entries, class A being for cars selling at \$2,000 and over; class B for cars selling at \$1,000 to \$1,999 and class C for cars selling at \$999 and under. The car that won was entered in class B.

The entries, the order in which they finished and the points penalized, were as follows:

CLASS A		
Car and Driver		Finish Penalty
Franklin—Cecil E. Gibson.....	6	62
Premier—Joseph W. Selva.....	15	..
Premier—E. E. Stafford.....	15	..
Premier—E. Dawson.....	18	..
Chalmers—S. W. Elstun.....	8	72
Premier—G. H. Dodge.....	7	..
Apperson—D. M. Jones.....	14	..
Knox—Frank Fauvre.....	7	63
Premier—Leonard Geiger.....	17	..
Premier—Z. H. Zimmerman.....	16	..
Premier—W. H. Berterman.....	10	136
Premier—Frank Morrison.....	5	52
CLASS B		
Jackson—O. S. Peck.....	1	5
E-M-F—Joe Rice.....	4	50
Cole—J. T. Elliott.....	20	..
Oakland—E. Darrow.....	13	..
Moon—W. M. Coval.....	9	84
Buick—F. H. Sillery.....	19	..
Chalmers—A. F. Meuser.....	2	34
Buick—M. G. Porter.....	3	45
Buick—Frank Menthorn.....	12	..
CLASS C		
Hupmobile—Fred I. Willis.....	11	..
Flanders—P. C. Bowen.....
*Did not finish		

RACING AT KENOSHA

Kenosha, Wis., June 19—The new dirt motordrome was opened yesterday with a meet which included Moross' string, de Palma and the Case string. Five races were run, with the Buick, Mercedes, Simplex and Warren-Detroit winners. In the 5-mile 161-230 class Strang ran into the fence in the home stretch because of a punctured tire, and a wrist was broken by the crash. Summary:

Five miles, class C, 161-230 class—Farr, Buick, won, 6:56; H. J. Mustain, Warren-Detroit, second, 6:10. Strang, the third starter, failed to finish.

Ten miles, class C, 301-600 class—Ralph de Palma, Simplex, 11:06; Brad Kent, Buick, second, 11:20; Billy Knipper, National, third, 11:48; W. H. Farr, Buick, fourth, 11:50.

Ten miles, class E, 600 and under, handicap—Ralph de Palma, Simplex, scratch, won, 11:19; Brad Kent, Buick, 10 seconds, second, 11:23; H. Burt, Buick, 30 seconds, third, 11:49.

Two miles, match race—Bob Burman, Mercedes, won, 2:17; William Knipper, Benz 120, second, 2:17.

Fifty miles, 231-300 and 301-600 class B—D. F. Borusch, Warren-Detroit, won the 231-300 class, 1:00:04; class A, Ralph de Palma, Simplex, won, 57:45.

GUTTENBERG'S MEET

New York, June 20—Far and away the best motor race meeting ever held on the ancient and dilapidated Guttenberg race track was given Saturday afternoon before an audience estimated at over 3,000. There was not a hitch in any part of the program and not the semblance of an accident. As for the sport it was enjoyable despite the fact that there were no tight fits at the finishes. Summary:

Five miles, class E, under 231 inches—Burke, E-M-F, won; Ferguson, Lancia, second; Craig, Paige-Detroit, third. Time, 6:09. Alslee, Regal; Tate, Regal, and Gastelger, Overland, also started.

Five miles, class E, under 301 inches—Gray, Schacht, won; Burke, E-M-F, second; Ferguson, Lancia, third. Time, 5:59. Gillam, Correja; Tate, Regal, and Robinson, S. P. O., also started.

Ten miles, class E, under 451 inches—Koopman, National, won; Burnich, Marmon, second; Whelan, National, third. Time, 10:42.

Ten miles, class E, under 601 inches—Whelan, National, won; Koopman, National, second; Beardsley, Simplex, third. Time, 10:30. Burnich, Marmon, also started.

Five miles, nonstock, fully equipped—Walker, over for Tate, Regal. Time, 6:44.

Five miles, match race, amateurs—Heltmeyer,

Glidden Tour Peace Fails To Materialize

Simplex, won; Munro, Simplex, second. Time, 5:20%.

Ten miles, free-for-all—Ormsby, National, won; Koopman, National, second; Whelan, National, third. No time taken. Beardsley, Simplex, and Tate, Regal, also started.

WALTER DONNELLY KILLED

Milwaukee, Wis., June 19—The classiest fields Milwaukee has ever seen competed in the seven events on the program for the first day of the first annual 2-day race meet under auspices of the Milwaukee Automobile Dealers' Association at the state fair park mile circular dirt track this afternoon. In spite of the fact that it was the classiest card known to Milwaukee, there was nothing sensational about it. About 8,000 attended the meeting. Summaries:

Five miles, class C, non-stock, 161-230 inches—Kulick, Ford, won; time, 4:59:18. Borsch, Warren-Detroit, second; Mustain, Warren-Detroit, third; Fahr, model 10 Buick, fourth.

Five miles, class C, non-stock, 231-300—Donnelly, Cino, won; time, 4:56:60. Rainey, Cino, second; Jagersburger, Case, third; Jones, Case, fourth.

Ten miles, class C, non-stock, 300-450 inches—Fahr, Marquette-Buick, won; time, 10:04:77. Fox, Pope-Hartford, second; McNay, Cutting, third; Burt, Marquette-Buick, fourth; Kulick, Ford, disqualified.

Twenty miles, class E, special open to class C non-stock chassis, 451-600 cubic inches—DePalma, Simplex, won; time, 19:20:42. Hearne, Fiat, second; Fox, Pope-Hartford, out nineteenth mile, broken oil pump.

Five miles, flying start, class D, free-for-all, non-stock—Burman, Mercedes, won; time, 4:40:35. Knipper, 120 Benz, second; dePalma, Simplex, third; McNay, Cutting, fourth.

Fifty miles, class E, open to all cars or chassis, class C, non-stock, up to 600 cubic inches, 2,300 pounds minimum—DePalma, Simplex, won; time, 51:48:11. Hearne, Fiat, second; Hughes, Mercer, third; Fahr, Marquette-Buick, fourth.

Ten-mile handicap, class E special event, free-for-all, non-stock—Borsch, Warren-Detroit, won; time, 10:15:50. Pearce, Falcar, second; McNay, Cutting, third; Mustain, Warren-Detroit, fourth; Donnelly, Rainey, Kulick, Fahr and Knipper finished.

Three miles against time—Billy Knipper in Blitzen Benz, :50:15:00.

One mile against time—Bob Burman in 120 Benz; time, 2:43:68.

Milwaukee, Wis., June 21—Donnelly, No. 15, in a Cino, went through the fence in the forty-fifth mile of the 50-mile race today. His skull was crushed and he died an hour later from his injuries. De Palma had a walkaway in all races he was in.

Summary:

Five-mile race, non-stock cars, 231 to 300 inches—Rainey, Cino, won; Jagersburger, Case, second; Hughes, Mercer, third. Time, 4:57:26.

Twenty miles, special, 301 to 600 cubic inches—De Palma, Simplex, won; Hearne, Fiat, second; McNay, Cutting, third. Time, 19:41:15.

Five miles, flying start—Burman, Mercedes, won. Time, 4:40:75.

Fifty miles—De Palma, Simplex, won; Kulick, Ford, second; Jones, Case, third. Time, 52:45:75.

Burman made 2 miles against time in 1:43:67.

SHOCK ABSORBER PATENT SUSTAINED

New York, June 19—After nearly 3 years of litigation, the United States circuit court again has sustained the Truifault-Hartford patent covering rotary friction shock absorbers broadly, and has directed that a perpetual injunction be issued against Harold J. Moore and Ruth H. Moore, doing business under the name of John Moore & Co., the New York agents for the Brush car, enjoining them from selling this car with this shock absorber.



PORTLAND FLORAL PARADE—FIRST PRIZE WINNER, M. J. CLEMENS

Hugh Chalmers, H. O. Smith and Howard Coffin Talk Over Case Now in Courts, But Attempts To Effect a Compromise Come To Naught—Trial Will Come To Hearing on Monday

DETROIT, Mich., June 20—Representatives of the Premier Motor Mfg. Co., of Indianapolis, held a conference here yesterday with Chairman Howard E. Coffin, of the Manufacturers' Contest Association, and with President Hugh Chalmers, of the Chalmers Motor Car Co., in a vain endeavor to come to some compromise regarding the litigation brought by the Premier company to secure possession of the Glidden trophy, won by the Chalmers.

The representatives of the manufacturers were brought together by Mr. Coffin and discussed the matter at length, each side advancing a compromise proposition. At the close of the conference an agreement had been found impossible without further consultation with principals, and the matter was postponed until such action could be taken.

Three elements enter into the proposed compromise. The costs in the case already amount to a considerable sum. The custody of the cup is, of course, the main issue. A third is the publicity derived from the tour, the cup and the result of the suit.

It is understood that the vital point at issue was over the possession of the trophy. On this point, as well as the payment of the legal costs, the Chalmers company flatly refused to listen to compromise.

The suit is set for further trial on Monday, but it is believed possible that the result of a second conference may result in the quashing of proceedings.

Mr. Coffin admitted at the close of the conference here that the Manufacturers' Contest Association seemed to have made little progress in its efforts to bring the contestants together.

"The association," said he, "believes

that the public is no longer interested in what has developed into a tedious legal battle over the result of a sporting event, now a year old. It was the hope of the association that the affair might be closed. We hope this may be accomplished."

In case a decision is rendered on the occasion of the resumption of the trial, it is virtually certain that an appeal will be taken to the supreme court, where proceedings will almost certainly consume at least another year.

BIG RACES TOO CLOSE

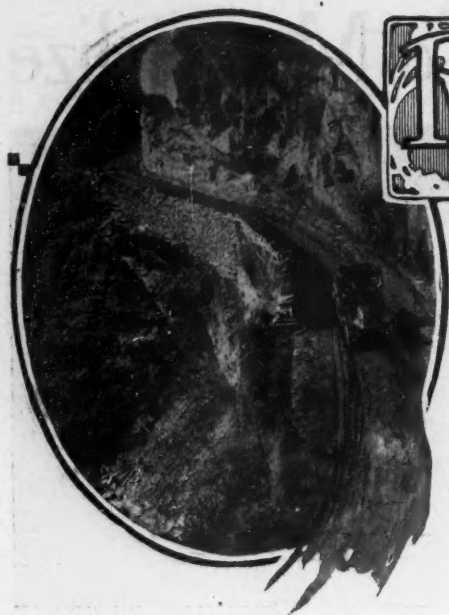
New York, June 21.—The board of governors of the Automobile Club of America has recommended to its contest committee the application of Savannah for the grand prix. It is likely this committee will insist that the Vanderbilt be not run so close to the grand prix, and that it will insist there be at least 2 days intervening. This means Savannah will have to run the Vanderbilt on Monday, November 27, or perhaps on November 25, with a light-car race on the 27th and the grand prix on the 29th. This will be decided later.

ELECTRICS IN BLIND RUN

New York, June 17—A secret-time contest for electrics was held Wednesday over the Long Island roads by the Electric Automobile Dealers' Association in which eleven participated. The distance covered was 38.6 miles and the time allotted for the trip was 3 hours 31 minutes. In division A, for men, the closest to the schedule was R. E. Darling in a Detroit electric, who covered the distance in 3:26:59. Mrs. C. Y. Kenworthy, in a Rauch & Lang, won the women's division, with 3:27:00.



Routes and Touring



A STEEP PITCH ON SKIPPER'S ROAD—A HEAVY STONE WALL IS BUILT AT THE SIDE TO PREVENT VEHICLES FROM GOING OVER THE ROCKY PRECIPICE

ONE of the last places for the American motorist to go for a touring vacation would be New Zealand. Primarily, this is because, perhaps, it is the most remote country in which touring can be enjoyed. New Zealand is 1,200 miles beyond Australia, a position about as far away from America as it could be. The dominion is an English possession, made up of three islands and measuring 1,000 miles from north to south. It resembles Italy and Sicily in the matter of size and arrangement. At present the population is 1,000,000, and there are half a dozen cities of over 50,000 population each.

Walter Grace, a commercial traveller, has sent Motor Age the accompanying photographs which he has taken from his 8-horsepower de Dion car which he uses in his trips throughout the country. As New Zealand is very mountainous in places the scenery throughout is rugged, and the roads in many places dangerous. One of

NEW ZEALAND TOURING IS FULL OF THRILLS FOR MOTORISTS

the leading roads in the south of the country, known as Skipper's road, was considered so dangerous a year or so ago that motor cars were barred from it because of the danger to horse traffic. This road is merely a narrow strip on a projection of the cliff with precipitous rocks rising above and the Shotover river in the valley beneath. The road is just wide enough for two vehicles to pass. At places along this road the bluffs are several hundred feet high.

But the scenery of New Zealand is not all confined to dangerous roads, the country has its pleasure valleys and its water landscapes. One of the beauty spots is Lake Wanaka, a placid body of water skirted by a hard stone road at one side of which the cliffs tower to a surprising height. This road is frequented a great deal by motorists in the island, as is also the road which follows the Molyneau river through the Roseburg gorge. Along this river vast amounts of gold are taken by dredges and some of the leading engineers assert there is today enough gold in the bottom of the river to redeem the entire national debt of the country, which amounts to \$300,000,000.

Another interesting scene in the gold-digging country is the suspension bridge, illustrated herewith, over the Kawarau river, which also is in the center of the gold-digging district. This bridge is higher at one side of the river than the other, owing to the different heights of the rocks constituting the shore line and the bridge must be crossed at a considerable incline.



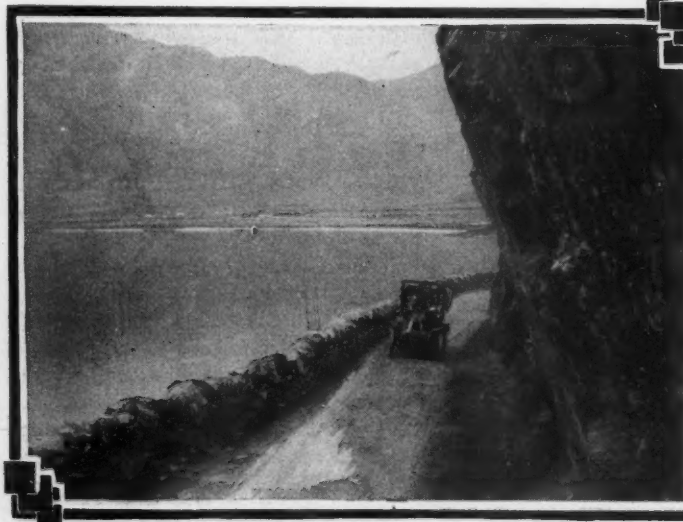
IN THE KAWARAU GORGE—THE ROADS ARE SO NARROW IN PORTIONS OF NEW ZEALAND THAT TWO VEHICLES CAN BARELY PASS—THE INCLINE BRIDGE

A curious mixture of palms of the tropics and trees of the temperate zone is seen.

WHEELING TO DENVER

Wellsburg, W. Va.—Editor Motor Age—We are anticipating a trip to Denver, Colo., and would feel very much indebted to Motor Age for any information touching upon this subject. We expect to start from Wheeling, W. Va., some time this summer and drive through to Denver.—E. B. Hough.

In Motor Age, issue of April 6, three different routes are outlined from Indianapolis to Omaha and a map is also shown. In the issue of March 23 the Omaha-Denver section appeared with a map. The missing link from Wheeling, W. Va., to



GLENDHU BLUFF AT LAKE WANAKA. HARD STONE ROAD WITH BLUFFS OVERHEAD



ALONG THE MOLYNEAU RIVER IN ROSEBURG GORGE. ALONG THE MOLYNEAU RIVER IN ROSEBURG

Information



SUSPENSION BRIDGE OVER KAWARAU RIVER CONNECTING BANNOCKBURN WITH CROMWELL—IN THE CENTER OF THE GOLD COUNTRY OF THE ISLAND

Indianapolis lies over the old national road, the itinerary of which is: Wheeling, St. Clairsville, Morristown, Fairview, Elizabethtown, Cambridge, Norwich, Zanesville, Hopewell, Brownsville, Hebron, Etna, Reynoldsville and Columbus; Columbus to Indianapolis—Columbus, Alton, Lafayette, Somerford, Brighton, Harmony, Springfield, Enon, Fairfield, Harshman, Dayton, New Lebanon, Alexandria, Eaton, Richmond, Cambridge City, Knightstown, Greenfield and Indianapolis.

The more southern route through St. Louis and Kansas City would be the last of the three to be recommended, on account of the heat. The route by way of Chicago ought to prove a comfortable one, although it adds considerable distance to your trip. A short digest of the running

ROUTES TO DENVER FROM THE EAST —OTHER TRIPS

directions from Chicago to Indianapolis, taken from the Automobile Blue Book, can be found in the issue of May 11.

The length of the entire trip in itself is long enough to warrant your taking the most direct road possible, and one which Motor Age believes you will find satisfactory is as follows: Indianapolis, Bridgeport, Belleville, Stilesville, Mt. Meridian, Manhattan, Harmony, Brazil, Staunton and Terre Haute. Continuing to Champlain and Bloomington, pass through Ellsworth, Clinton, Newport, Cayuga, Perrysville, Danville, Catlin, Homer, Champaign, Mahomet, Mansfield, Farmer City, Le Roy and Bloomington. An optional route from Indianapolis to Champaign which eliminates Terre Haute takes you through Clermont, Pittsboro, Jamestown, New Ross, Whitesville, Crawfordsville, Wayne, Hillsboro, Veedersburg, Covington, Danville, Catlin, Homer, Urbana and Champaign. This is some 50 miles shorter than the one by way of Terre Haute and is also over good roads. At Bloomington a road leads through Pekin, Bushnell and Carthage to Keokuk, Ia., where you will strike the Waubonsie trail described in Motor Age, issue of May 4. This will take you across Iowa to Nebraska City and connect with what is known as the Overland trail, said to be in the pink of condition. This road carries you on to Denver through Dunbar, Syracuse, Unadilla, Palmyra, Eagle, Lincoln, Dorchester, Friend, Exeter, Fairmont, Grafton, Sutton, Saronville, Harvard, Flickville, Hastings, Juniata, Heartwell, Minden, Axtell, Funk, Holdrege, Atlanta, Oxford, Edison, Arapahoe, Holbrook, Cam-



ACROSS LEE RAVINE NEAR DUNEDIN. THERE IS A 3-MILE HILL AT EACH SIDE OF THE BRIDGE WHICH CROSSES THE RAVINE—ROAD TO THE SUMMIT

bridge, Bartley, Indianola, McCook, Culbertson, Laisade, Wauneta, Imperial, Lamar, Holyoke, Colo., Paoli, Haxtum, Fleming Station, Galien, Sterling, Merino, Snyder and Ft. Morgan.

If you prefer following the route which the Glidden tour traveled in 1910 from Omaha to Denver, you would leave the Waubonsie trail at Shenandoah and then go through Randolph, Tabor, Glenwood, Council Bluffs to Omaha, when you would strike the Glidden route.

There is not a doubt but that the route outlined over the old National highway, Waubonsie and Overland trails will prove to be the best you can find, taking everything into consideration—roads, distances, etc. During the season of 1910 a lot of work was done on the old national road and you can easily make Columbus, O., in a day. You will find a stone road the entire 128 miles, but there are several long, winding hills where you will have to be cautious. You will be obliged to cover 176 miles in order to make Indianapolis the



AMONG THE HILLS IN SOUTHERN NEW ZEALAND, A LAND OF RUGGED BEAUTY



AROUND THE SHORES OF LAKE WANAKA, ONE OF THE BEAUTY SPOTS OF THE ISLAND

next night's stop, and as this leg of the route is over level country you can keep up a good speed. It is 127 miles to Champaign over the most direct road and 167 miles by way of Terre Haute, but either of these can be made in a day, as you will find mostly level country, and dirt or gravel roads. If you take the shorter run it would probably be best to go to Bloomington—54.5 miles—for the night stop, as you can more easily make the next day's run to Keokuk, Ia., which is a distance of 146 miles from Bloomington. You can cross the Waubonsie trail in 2 days, so Motor Age is informed, stopping at Leon, Ia., one night and Nebraska City the next, making each day's run approximately 150 miles; or you can make shorter runs across the state, as practically all the towns have good hotel accommodations.

All along this trail the booster spirit prevails, and tourists get the glad hand at every stop. Motor Age is informed that if tourists give the president of the Waubonsie association an idea of when they are coming through and where they expect to stop, he will notify the towns along the line to take care of them. It is probable that you can make Denver in 3 days, stopping at Minden and Imperial.

AN ILLINOIS ROUTE

Mena, Ark.—Editor Motor Age—Will Motor Age kindly publish the best motor car route from St. Louis, Mo., to Decatur, Ill.?—I. M. Davis.

The route lies through Springfield and thence due east to Decatur, the total distance being 207 miles. The stretch from St. Louis to Springfield is over unimproved country road practically the entire distance, and it will be found but fair to travel over even in settled weather. The itinerary is as follows: Collinsville, Edwardsville, Worden, Staunton, Mt. Olive, Litchfield, Waggoner, Farmersville, Glen-

arm, Springfield, Dawson, Buffalo, Lanesville, Illiopolis, Mantic, and Decatur. Specific information can be secured from the Automobile Blue Book Co., Chicago.

NORTH CAROLINA TRIP

Henderson, N. C.—Editor Motor Age—Through the Routes and Touring Information department will Motor Age give me the best route from Henderson, N. C., to Windsor, N. C.; also the approximate distance?—William Corbitt.

The distance of this little trip is 105 miles, through Greystone, Middleburg, Ridgeway, Macon, Littleton, Thelma, Weldon, Garysburg, Kackson, Roxobel, Lewiston and Windsor. You will travel over red clay roads as far as Weldon, and unless there are heavy rains you will find it good. At Weldon there is a toll bridge, and from there on a gray sand road.

LITTLE ROCK TO ATLANTIC CITY

Little Rock, Ark.—Editor Motor Age—I am thinking of trying to go from Little Rock to Atlantic City, N. J., starting about July 1 or thereabouts. Will Motor Age tell me what it considers the best route, preferably through Memphis, as we can use the 1910 Glidden tour route from here to Memphis. Kindly estimate the number of days you think this trip would require, also please state if the states traversed would require any fee license. My car is a Chalmers 30.—C. J. Drees.

The only thing for you to do is to follow the 1910 Glidden tour route from Little Rock, Ark., to Cincinnati, O. The Gliddenites made this in 5 days, the night stops being Memphis, Sheffield, Nashville, Louisville and Cincinnati.

The next stop for the night might be at Columbus, then Wheeling, Cumberland, Washington, D. C., and Philadelphia. It is only a run of 60 miles from there to Atlantic City. The itinerary as far as Cincinnati is as follows: Little Rock to Memphis, 207.7 miles—Lonoke, Stuttgart, Clarendon, Helena and Tunica; Memphis to Sheffield, 161.7 miles—Aulon, Germantown, Bailey, Piperton, Moscow, Grand Junction, Saulsbury, Rogers Springs, Esary Springs, Corinth, Burnsville, Iuka, Cherokee, Barton and Tusculumbia; Sheffield



BLUFF ON SKIPPER'S ROAD, 18 MILES FROM QUEENSTOWN, NEW ZEALAND

to Nashville, 119.7 miles—Florence, St. Florian, Greenhill, Loretto, Pleasant Point, Lawrenceburg, Summertown, Mount Pleasant, Columbia, Spring Hill, Franklin, and Brentwood; Nashville to Louisville, 193.9 miles—Goodlettsville, White House, Mitchell, Franklin, Bowling Green, Glasgow Junction, Bear Wallow, Hardyville, Pikeview, Magnolia, Buffalo, Athertonville, Balltown, Cox's Creek, Mt. Washington, Ferncreek and Buechel; Louisville to Cincinnati, 162 miles—Middletown, Boston, Simpsonville, Shelbyville, Clay Village, Peytona, Graefenberg, Bridgeport, Frankfort, Jett, Versailles, Lexington, Georgetown, Corinth, Mason, Williamstown, Crittenden, Walton, Kensington, Florence and Covington.

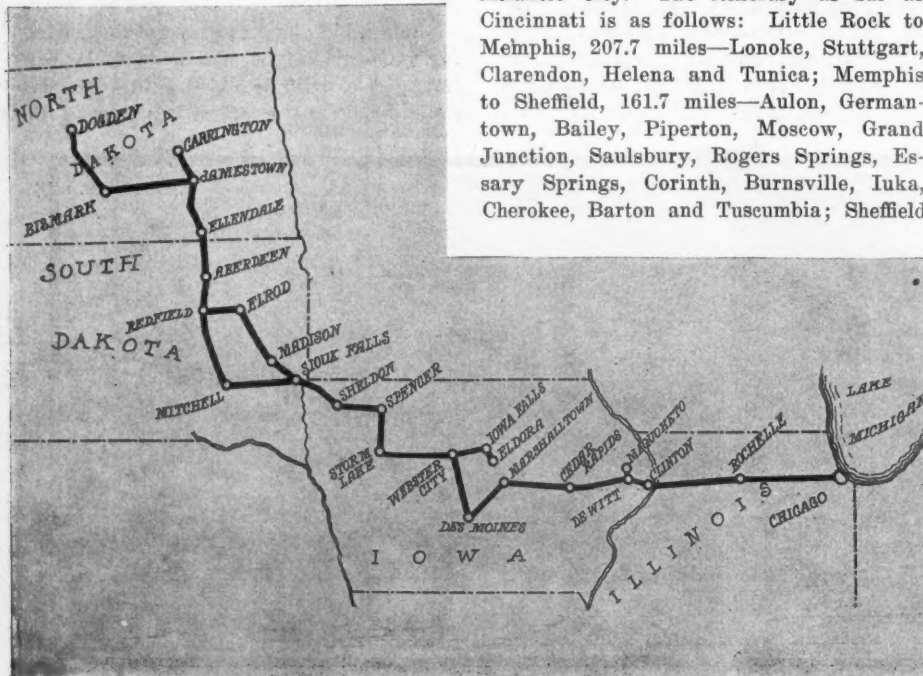
From Cincinnati to Dayton travel through Sharon, Pisgah, Mason, Lebanon and Ridgeville, a distance of 53.8 miles. Dayton to Washington is outlined in Motor Age, issue of March 30, accompanied by a map; and Washington, D. C., to Atlantic City, N. J., can be found in this issue, page 25, under the head of "For Washington Motorists."

First be sure that you have complied with the laws of Arkansas, then you will have no trouble in touring through the different states until you reach New Jersey. Here you will be obliged to pay a registration fee of \$1.

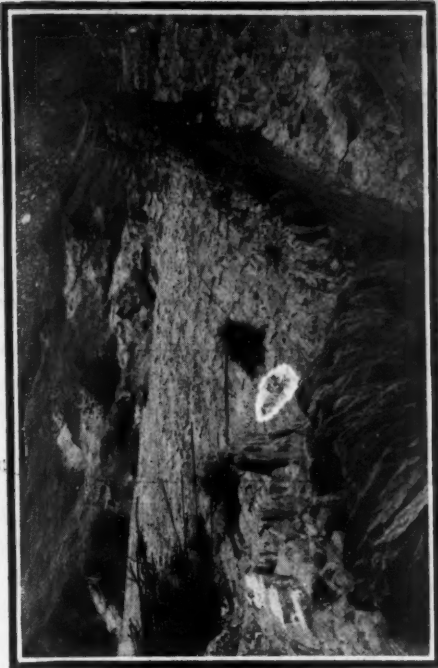
NORTH DAKOTA TO IOWA

Carrington, N. D.—Editor Motor Age—Kindly give me the route from Carrington, N. D., to Eldora, Ia.—Subscriber.

Motor to Jamestown, from which point you will follow the route outlined in the inquiry from Dogden, N. D., in this issue as far as Webster City, and continue on the Hawkeye highway through Blairsburg, Williams, Wilke, Alden and Iowa Falls.



ROUTE FROM DOGDEN, N. D., TO CHICAGO



PRECIPICE ON SKIPPER'S ROAD—THE MOST DANGEROUS ON THE ISLAND

Eldora lies south of Iowa Falls through Hughes. Although over roads not quite so good, a short optional route from Rock Rapids takes you through Perkins, Sioux Center, Maurice, Le Mars, Remsen, Marcus, Cleghorn, Meriden, Cherokee, Aurelia and Alta to Storm Lake.

TO CHICAGO FROM SOUTH DAKOTA

Dogden, N. D.—Editor Motor Age—I expect to start shortly on a trip from Dogden, N. D., to Chicago. I would like to pass through Jamestown, N. D., Aberdeen, S. D., Des Moines and Maquoketa, Ia., if convenient. Will Motor Age kindly name the best route for me to take and mention the towns through which I would pass, also the approximate distance?—R. A. Pence.

Should you care to motor first to Bismarck pass through Turtle Lake, getting posted here for the road east of Washburn to Canfield, from which point the route lies south on a main traveled road to Bismarck. You will have no trouble in securing information to Jamestown from any of the motor car dealers. There is an easy road to follow going through Edgeley, where the Chicago, Milwaukee & St. Paul railroad is generally followed through Monango, Duane and Ellendale. Aberdeen is almost straight south about 40 miles over an excellent prairie road and it takes a hard rain to spoil it.

Leaving Aberdeen, motor south about 42 miles into Redfield and 35 miles to Wolsey through Tulare, Spotswood and Bonilla, following the railroad fairly closely. Huron, Woonsocket, Ketcher, Mitchell, Riverside, Fulton, Farmer, Spencer, Salem, Montrose, Humboldt, Hartford, Sioux Falls, Benclare, Larchwood, Lester, Rock Rapids, Sheldon, Sanborn, Hartley, Spencer, Sioux Rapids and Storm Lake are to be followed next in order. Storm Lake is on the Hawkeye highway and you will continue on this road through Sulphur Springs, Newell,

Fonda, Pomeroy, Manson and Ft. Dodge to Webster City.

To Des Moines you will travel south through Standhope, Boone, Madrid and Polk. The stretch to Maquoketa takes you through Altoona, Mitchellville, Colfax, Newton, Laurel, Marshalltown, Le Grand, Montour, Tama, Chelsea, Belle Plaine, Cedar Rapids, Mt. Vernon, Lisbon, Mechanicsville, Clarence, Lowden, Wheatland, Grand Mound, Dewitt, Delmars and Maquoketa.

The best roads can be found by traveling through Delmars, Dewitt, Elvira, Clinton, Fulton, Morrison, Round Grove, Sterling, Dixon, Ashton, Rochelle, Creston, Malta, Dekalb, Maple Park, Peneva, West Chicago, Lombard and Chicago. A great deal of this trip is covered by the Automobile Blue Book in volume 4 on the middle West, and it is of great assistance to those touring through unfamiliar territory.

FOR WASHINGTON MOTORISTS

Washington, D. C.—Sometime when Motor Age wants to give Washington motorists some information that they will appreciate in the Routes and Touring department, give us a good route from Washington to Baltimore, Philadelphia, Atlantic City, and on to New York city. Washington motorists frequently make that trip, and some detailed information will be appreciated by many of us.—W. T. Gill.

The most traveled thoroughfare into Baltimore is 44 miles in length over the old Baltimore road which is now a fine macadam boulevard most of the way. First you will reach Bladensburg 6 miles out from Washington, D. C. This small town is famous in American history as a duelling ground where many duels growing out of quarrels in Washington were fought. Just west of here at the bridge over the Potomac the battle with the English which preceded the capture of Washington took place. The road follows on through Hyattsville, Beltsville, Contee, Laurel, Elkridge, Relay, Catonsville and Baltimore. Jones Falls and Federal hill should be visited while in Baltimore as well as the numerous monuments.

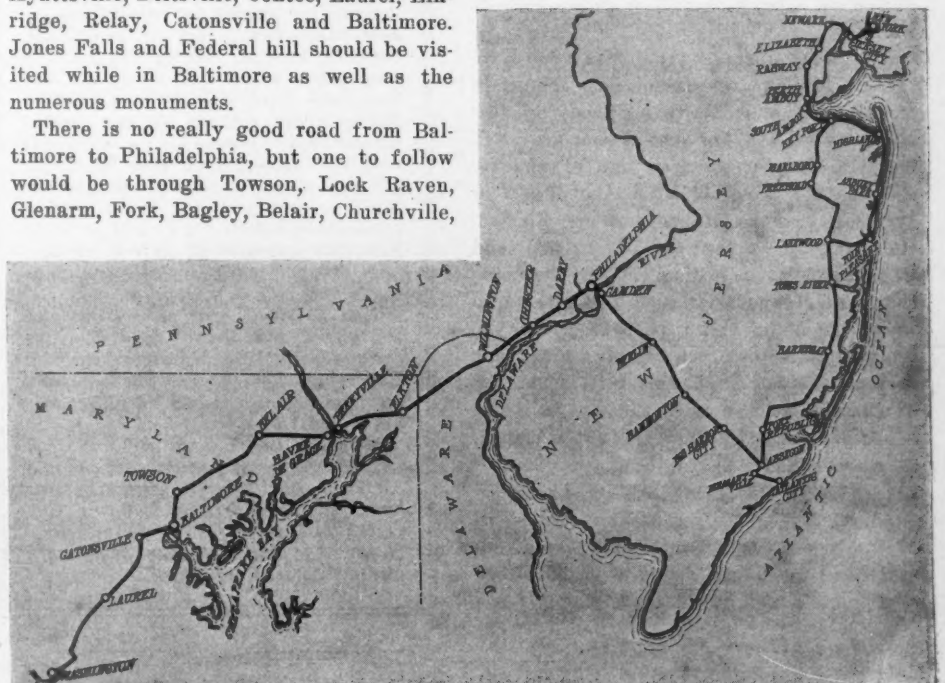
There is no really good road from Baltimore to Philadelphia, but one to follow would be through Towson, Lock Raven, Glenarm, Fork, Bagley, Belair, Churchville,

Earlton, Havre de Grace, which dates back to 1670; Perryville, Northeast, Elkton, Newark, Marshalltown, Wilmington, Chelsea, Village Green, Chester, where the city hall built in 1724 still stands; Norwood, Darby and Philadelphia. At Wilmington will be found the Holy Trinity church built in 1698 and said to be the oldest building in the United States in continuous use as a church since its erection.

Leaving Philadelphia, cross the Delaware river to Camden by ferry and thence travel on to Magnolia, Overbrook, Berlin, Hammonton, Egg Harbor City, Pomona, Absecon, Pleasantville and Atlantic City, the prominent summer resort. Retracing the road to Absecon, branch off north through Smithville, Port Republic, New Gretna, Tuckerton, Manahawken, Barnegat, Forked river, Toms river, Lakewood, Burrsville and Point Pleasant, where you follow along the shore through Manasquan, Belmar, Asbury Park, Elberon, Long Branch, Seabright, Highlands, Atlantic Highlands, New Mammouth, Keyport, Morgan, South Amboy, Perth Amboy, Rahway, Elizabeth, Newark, Jersey City, and ferry across the Hudson river to New York.

The mileage is as follows: Washington, D. C., to Baltimore, 44 miles; Baltimore to Philadelphia, 108.3 miles; Philadelphia to Atlantic City, 60.5 miles; Atlantic City to New York, 152.4 miles.

Another way into New York from Perth Amboy is to cross to Tottenville, Huguenote, New Dorp, Stapleton, St. George and New York, using the Staten Island ferry and the municipal ferry. The ferry charges are 50 or 60 cents for the car and driver and 5 cents each for passengers. If you do not wish to follow the coast from Lakewood an inland route from Lakewood would be Farmingdale, Ardena, Adolphia, Freehold, Marlboro, Wickatunk, Freneau, Matawan and Keport.



FROM WASHINGTON TO NEW YORK THROUGH PHILADELPHIA

TIGHTENING SPOKES

DUNCAN, Okla.—Editor Motor Age—Will Motor Age kindly give me by return mail the name of a filler used to tighten the spokes of a car when the flange nuts are tight? Also the name of the firm where I can obtain same?—M. C. Houston.

Motor Age has no data regarding a filler used to tighten the spokes of a car when the flange nuts are tight. Troubles of this kind are brought to some of the largest companies in Chicago that do repairs of this nature, and the course generally followed is to remove the rim and about four spokes from the wheel and replace the spokes with larger ones. The four spokes are placed at equal intervals around the wheel.

If any reader knows of a substance that will tighten the spokes of the wheel without going to the trouble above mentioned, Motor Age will be glad to hear from him.

CLEANING MOHAIR TOP

Toledo, O.—Editor Motor Age—As a subscriber of Motor Age I would be pleased to have Motor Age give me the best and most improved method of renewing the appearance of a mohair top which I have on my car. It is soiled both inside and outside and I want to secure some kind of a dressing.—W. Bretsch.

Make a suds of ivory soap and lukewarm water. Take a stiff brush and dipping it in the suds brush the top inside and out until the dirt is removed. This done, take cold water and go over the top inside and out, to rinse and remove any soap that might be on the surface.

CHARGING AN ELECTRIC

Enid, Okla.—Editor Motor Age—I have a rectifier for charging an electric car with twenty-four cells, and I wish to charge one with sixteen cells. Will Motor Age tell me how to put on my resistances, and what size wire to use to do so?—B. Ball.

You must increase the resistance one-third. If your resistance box comprises a series of coils of wire, connect up one-third more wire of the same size and material in series with that of the resistance box. Not knowing the design or type of your resistance box an illustration cannot be given; but if you will send us a sketch of it, a diagram may be made that will aid you. It also is desirable to know the make and type of rectifier you are using, also how you are obtaining your current. If you are paying for the amount of current used, a wire rheostat is quite expensive, and by increasing the resistance the expense is increased.

EFFICIENCY OF GASOLINE

Alma, Mich.—Editor Motor Age—Will Motor Age advise me through the Readers' Clearing House the relative efficiency of the high and low-test gasoline for use

The Readers'

in a gasoline engine. Is there any objection, as far as you know, to using a low grade gasoline, say 58 degree test, in a motor aside from the trouble in starting in cold weather? I have heard that the low

PARTS AT SANE PRICES

SAUK CENTRE, MINN.—Editor Motor Age—I wish to register my kick with the others regarding the exorbitant prices charged for extra parts. I fear the maker does not look far enough into the near future, for there is abundant capital lying idle which as soon as legal will make these same parts and put them upon the market at 50 to 75 per cent less than they can be had today. I once worked on the road for a Chicago house selling manufactured goods, and it was an established policy of the company to sell their extras at very reasonable prices, and in many cases we gave the party the broken part, and by so doing got the best advertising possible. The rule in the motor industry seems now to be for the maker to get all he can in the first place and then force the customer to pay three or four times over the first price of the part in the car. I think this is not good business policy. The parts of the standard car as listed will foot up nearly three times the cost of the car when first bought. Why this? The purchaser pays all carriage charges, and if the part can be sold at first for 75 per cent less with assembling added why not 75 per cent less than now charged with assembling left out? Will some wise manufacturer arise and explain?

Just one illustration: A small bevel gear, weighing about 6 ounces, costs \$8. The gear cutter will cut that gear in less than 30 minutes! Allowing the maker \$1 per pound for the steel, when it can be bought for from 8 to 9 cents per pound, we readily can see how we are being, rich and poor alike, actually robbed. Many times these same parts are said to be of the best vanadium steel, and after a trial in the gearcase we find to our garage sorrow that the gear was a low-grade real cast iron chilled and hardened, the chilling preventing our finding out the true nature of the metal until a breakdown results. A friend of mine had this experience. After he had paid \$30 for two gears and one drive shaft and had a mileage of only 100 miles, the small gear played out and on removing it to put in a new one the grade of the metal was discovered. Reporting the same to the company no satisfaction was had. Another new bevel had to be bought at the \$8, as "no gears are warranted." We do not believe the makers of this car will continue in business long. Let us kick, fellow motorists, until manufacturers sell us parts at sane prices. Motor Age will help the good work along.—A. D. Carpenter.

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

grade gives a more powerful explosion and would like to have this verified.—H. C. Richardson.

It is claimed the lower grades of gasoline increase the formation of carbon deposits in the cylinders. Motor Age has no data wherein it is shown that the lower grades of fuel are capable of giving a more powerful explosion.

WHO MAKES THE LE BLANC

Elyria, O.—Editor Motor Age—Will Motor Age tell me, through the Readers' Clearing House, where the Le Blanc carbureter is made or where repairs can be secured?—Blake W. Carrington.

Motor Age has no data regarding the Le Blanc carbureter, but would be glad to receive an answer to this inquiry from any readers possessing the information.

REGARDING MAGNETO LIGHTING

Kempton, Ill.—Editor Motor Age—Will Motor Age kindly tell me how I can install electric lights on my Halladay car. This car is fitted with a Bosch magneto, and I want to run the lights from the magneto. I have the reflectors and bulbs, but no wiring diagram.—T. C. Richards.

The Bosch high-tension magneto cannot be used for lighting purposes.

FACTS ABOUT THE BENZ

Parsons, Kan.—Editor Motor Age—Will Motor Age through the Readers' Clearing House answer the following questions?

1—Where and by whom are the Benz cars manufactured?

2—Can the black varnish that covers the brass lamps and trimmings of motor cars be removed? Will Motor Age give a receipt for a solution that will remove it?

3—Do the Blue Books contain road maps for touring in Kansas, Missouri and Colorado? Please quote the price of the book.

4—Has Barney Oldfield quit the racing game for good? And to whom did he sell his racing cars?

5—From what is the gas made with which the Prest-O-Lite tanks are charged?—Lerman H. Robinson.

1—The Benz cars are manufactured by Benz & Co., Mannheim, Germany.

2—The black varnish that covers the brass lamps and trimmings of motor cars can be removed with turpentine, or more readily with a solution known as Varnish Remover which is obtainable at almost any painters' supply store.

3—No. The Blue Books, as yet, do not



Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

cover any of the above mentioned territory farther west than Omaha and Kansas City.

4—It is reported that Barney Oldfield has quit the racing for good; and that he sold his racing cars to E. A. Moross, who is now entering them in the various race meets being held throughout the country.

5—The acetylene gas with which Prest-O-Lite tanks are charged is made by dissolving calcium carbide in water, the process being practically the same as that employed in the ordinary generator.

CLUTCHES AND TRANSMISSIONS

Otsego, Mich.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions?

1—What kind of a clutch is best, and why?

2—What transmission is the best, and why?

3—What kind of a drive is the best, and why?

1—The multiple-disk clutch is the most popular at the present time; but the efficiency of any of the popular types of clutches depends almost entirely upon their design, construction and the care which they receive.

2—The selective type of sliding-gear transmission is most popular; but other types have their advantages and, like the clutches, the design and construction are important factors when relative efficiency is considered.

3—The shaft drive is by far the most popular and efficient under prevailing conditions, but chain drive is more efficient as far as the transmission of power is concerned.

TIMING MORA VALVES

Warrens, Wis.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions:

1—I have a 1910 four-cylinder Mora car with $4\frac{1}{2}$ -inch bore and $5\frac{1}{2}$ -inch stroke. There are no marks on the flywheel to show the timing of the valves, and I desire to know how to set the valves so as to get the best efficiency. Are the valves timed differently on long-stroke motors like the above, than on a motor having the stroke equal to or less than the bore? Connections are as tight as tendency to knock on hard pulls if the throttle is opened much. Is this caused

by too rich mixture on open throttle, or by the wrong setting of the valves? The knock is not caused by the advance of the spark, I am sure.

2—What mistake in setting of the valves would be liable to occasion knocking in the motor?

3—What would be the effect of making an opening in the intake manifold just above the carburetor to take in air and to use in priming motor?—R. Barber.

1—There should be marks on the timing gears that will enable you to see that they are properly meshed. Motor Age has no data on the valve timing of the 1910 Mora car and would be glad to get this information from some owner of a 1910 Mora motor car. All that would be necessary in case the timing gears are not marked would be the amount of piston travel from top dead center of one inlet valve before the opening and the closing of the exhaust valve of the same cylinder.

This might be determined by getting one of the pistons on the top dead center, placing a piece of wire down through the priming cock so that it will rest on the piston head, then mark the wire. Next place a thin piece of paper between the valve stem and lifter of, say, the inlet valve and turn the motor very slowly in the direction of its operation, at the same time sliding the paper about between the valve lifter and stem. As soon as the cam starts to raise the lifter to open the valve, the paper will be seized and as soon as the paper is seized the movement of the piston should cease and the wire marked. It will be found that the inlet valve should open when the piston is about $1/32$ inch down on the suction stroke. It generally takes two persons to do this, one to turn the crankshaft of the motor slowly by taking hold of the flywheel, and the other to hold the wire in one hand and slide the paper between the valve stem and lifter with the other. If the correct point of opening or closing of one inlet and one exhaust valve is known and these properly set, the opening and closing of the rest of the valves will be right, because the shape of the cam determines the relative length of valve opening; and if the gears are meshed so that one cam opens and closes at the right time, then the timing of the rest of the valves follows as the night the day; except, of course, in such remote cases where the camshaft is twisted or the cams worn or shifted.

Your knocking probably is most due to preignition due to accumulations of car-

bon on the piston and cylinder heads of your motor.

An error in the setting of the valves would hardly cause knocking but would cause considerable loss of power. The proper closing of the exhaust valve is most important, if it is held open too long, the burned gases driven out will be drawn back into the cylinder, and if it closes too soon the greatest possible quantity of burned gases will not have been expelled.

3—An opening in the intake pipe for the above mentioned purpose might be beneficial at high speeds, but would most probably cause misfiring at low speeds. Don't make a hole in the inlet pipe.

RACING QUERIES

Frankfort, Ind.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions?

1—What is the weight of the racing car in which Barney Oldfield broke the world's record, also the horsepower and number of cylinders?

2—Why do pneumatic tires burst on racing cars?

3—How many pounds air pressure does the Benz racing car carry in its tires?

4—Why do they not use solid tires on heavy racing cars, and what effect would they have on the motor?

5—Would not a heavy racing car with solid tires consume more power than with pneumatic tires on account of the intense vibration?

6—When running a racing car from 70 to 80 miles per hour, or faster, a tire bursts. Is this bursting caused by the car turning turtle or is it caused by the driver turning the steering wheel?

7—On what principle does the hot-air motor work?

8—Does Motor Age think the hot-air motor will rival the gasoline motor of 35 to 50 horsepower?

9—Are hot-air motors very speedy?—A Reader.

1—The shipping weight of the big Benz is 2,500 pounds; it has four cylinders, and having a bore of 7.2835 inches, has an A. L. A. M. rating of about 85 horsepower.

2—The pneumatic tires used on racing cars generally burst after the rubber tread portion has been worn away and the fabric weakened to such an extent that it no longer can stand the terrible strain to which the tire is subject. It is claimed that many of the tire explosions are caused by the expansion of the air in them due to the heat generated by friction with the road surface. The heat generated by friction and vibration is sufficient to disintegrate the rubber in a very short time, and often though the casing is capable to withstand the strains the tube will be softened up and the air allowed to blow out under the bead of the casing. It also is claimed by some that the heat



it is pulled out from under the lugs on the turns, and thus opening up a gap through which the tube blows out.

3—The Benz racing car carries about 85 pounds pressure in its tires.

4—Solid tires consume too much power and greatly increase the vibration.

5—Yes.

6—If the car turns turtle, the accident generally is due to previous loss or deflation of a tire, which causes the car to skid and the comparatively sharp rim of the wheel to dig into the road surface and abruptly prevent the skidding. When a tire is lost on an unbanked turn of a dirt track, overturning the car is almost the inevitable result; though there are cases where drivers have come through without upsetting.

7—The principle under which the hot-air engine works is that of the expansion of air when subject to heat.

8—There are no indications that would lead Motor Age to entertain such a belief.

9—No. They are very slow acting motors. There is no comparison between the speed of a hot-air motor and a gasoline engine, at the present time.

LOCATING A KNOCK

Warsaw, Ill.—Editor Motor Age—Kindly answer the following questions through the Readers' Clearing House columns:

1—Do the cross fins in a tubular radiator play a conspicuous part in cooling?

2—How many crankshaft bearings has the average four-cylinder motor? My model 4 McIntyre has five.

3—There is a knock in the front cylinder of my car and I am unable to locate it. The crank block is tight and also the connecting-rod seems tight, but there are two small set screws at the top of each connecting rod and most of them in all the cylinders are loose; I cannot tighten them, as the threads seem stripped. The knock seems to come just as the exhaust valve opens. It does not affect the motor's running.

4—Why is it sometimes necessary for me to prime the carburetor before starting, even if the motor only stands a few minutes?

5—My motor starts on one or two cylinders and sometimes I have to advance and retard the spark once or twice before all the cylinders will work, but after that I have no trouble.

6—What is the A. L. A. M. horsepower rating of this motor, and what is the compression?

7—What gasket material would you advise for the intake manifold?—J. E.

1—The cross fins of a tubular radiator play a most important part in the construction of the radiator; without them considerably more tubing would be required to give the radiator the necessary cooling efficiency.

2—The average four-cylinder motor with its cylinders cast in pairs has a three-bearing crankshaft; whilst the aver-

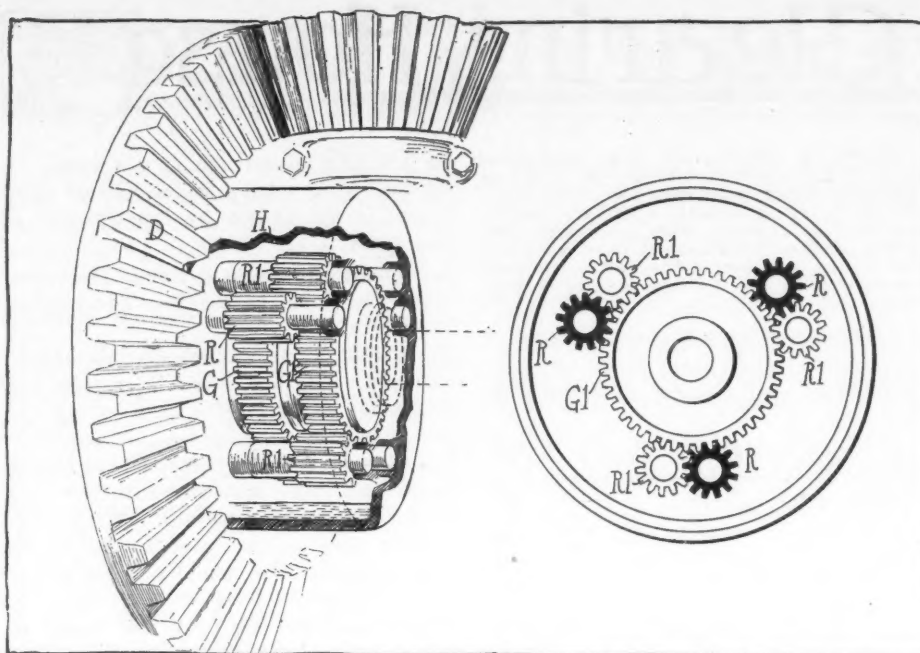


FIG. 1—SHOWING DETAILS AND OPERATION OF SPUR GEAR DIFFERENTIAL

age four-cylinder motor with its cylinders cast separately has a five-bearing crankshaft.

3—The knock in the front cylinder is most probably due to a loose connecting rod, though it is possible that preignition is taking place as a result of carbon accumulations. The connecting rod may be loose at the piston end. Had you stated how you had succeeded in locating the knock and how you come to believe that it occurs just as the exhaust valve opens, a more definite reply might be given. A very good way to locate a knock is by means of a large file or screw-driver with a handle, or by means of a stick of wood, the point of which can be placed against various portions of the motor and the handle or other end snugly against the ear or forehead. If the knock is in the cylinder, it would be most audible when the point of the sounding-tool was placed against the head or walls of the cylinder; and if caused by a loose rod on the crankshaft, or crankshaft bearing, the sound would be most audible when the point of the sounder was rested against the crankcase, near the front bearing.

4—The necessity of priming the carburetor of a motor is most common and is due to the fact that unless the walls of the mixing chamber of the carburetor are wet with gasoline sufficient carburetion is unobtainable. When the carburetor is primed, gasoline overflows from the nozzle and runs down the spraying nozzle and either drenching the walls of the air-inlet or forming a pool in it, which helps to saturate the incoming air and form a mixture suitable to start the motor.

5—The failure of the motor to hit regularly on all four cylinders at the beginning, may be due to poor carburetion caused either by the coldness of the cylinders and inlet gas passages, or oversaturation of the air due to the flooded

condition. It also might be due to an accumulation of oil or water on the points of the spark plugs, which causes a short circuit until blown off by the in and out-rushing gases.

6—Having a $4\frac{1}{4}$ -inch bore and being a four-cylinder motor, the A. L. A. M. horsepower rating is 27.2.

7—Asbestos gaskets applied with shellac are most generally used.

PIERCE-ARROW DIFFERENTIAL

Harrisonville, N. J.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly explain and illustrate how the differential in a Pierce-Arrow car works.—Samuel B. Horner.

The design of a differential such as is used in the rear axle of the Pierce-Arrow cars is shown in Fig. 1. The inner ends of the driving axles carry spur gears G and G1 which are in mesh with other spur gears R and R1, respectively. The gears R and R1 are long, but small in diameter, and arranged in pairs as illustrated, in mesh with each other at their inner ends, and each member of a pair meshing with one of the axle gears G or G1. The small gears revolve on studs supported by the housing H that is attached to and revolved by the drive gear D. If the small gears meshed only with the axle gears, and not with each other, revolving the housing would cause them to roll around the axle gears, all rotating on their studs in the same direction, and the axle gears remaining stationary. Being in mesh with each other, they cannot revolve in the same direction, for when two gears are in mesh they must revolve in opposite directions. Thus, the small gears cannot roll around on the axle gears when the housing is revolved, and if there is equal resistance to the turning of the wheels, the small gears will not revolve on their studs, but will

carry the axle gears with them. If the car is turning a corner, the greater resistance to the inner wheel will cause the small gears to revolve on their studs, rolling around the resisting gear and driving the other correspondingly faster.

TWO-CYCLE HORSEPOWER

Elgin, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions:

1—How is the horsepower of a two-cycle motor determined, considering bore, stroke, and the number of revolutions? Can Motor Age give a formula in general use?

2—What is the construction of the Amplex two-cycle motor?

3—Is there any formula or data regarding ratio of area to water area of radiator cylinders; based on a piston speed of 1,000 feet per minute?—X.

1—Roberts' formula for two-cycle gasoline engines is

$$\frac{D^2 \times L \times R \times N}{13500} = \text{Horsepower}$$

D = Diameter of cylinder in inches.

L = Stroke of piston in inches.

R = Revolutions per minute of crankshaft.

N = Number of cylinders.

2—The construction of the Amplex motor is quite clearly described and illustrated in the catalogs issued upon request by the Simplex Motor Car Co., Mishawaka, Ind.

3—It is quite possible that some of the radiator manufacturers have formulæ for ascertaining the required ratio between radiator and motor-jacket area based upon piston speed of 1,000 feet per minute, but there is no formula of that nature which is applicable to all makes and types of radiators. In Fig. 2 the means employed by the Briscoe Mfg. Co. for determining the efficiency of its radiators is illustrated; and the following de-

scription and data given out to designers by this company should give you an idea of the methods employed in choosing the proper sized radiator for a given motor.

Referring to the sketch, an inclosed hood is fitted at its rear with a disk fan. At its front is an arrangement of shutters whereby the opening can be changed to any size or shape. A radiator is placed in this opening, and the shutters are closed so that all the air drawn through by the fan can pass through the radiator. Above stands a hot water tank, with pipes entering it carrying hot water, cold water and steam. These are so regulated that this tank is kept full of water at an even temperature, generally 100 to 200 degrees Fahrenheit. From this tank a pipe runs down to the radiator inlet with a thermometer. The outlet pipe for the radiator also has in it a thermometer and a valve for regulating the flow. The cooled water escapes into the top, which stands on a scale.

Hot water is passed through the radiator at a uniform rate and weighed every 2½ minutes for verification. The fan is run at a uniform rate, and the fan speed is taken every 2½ minutes as a check. Every 2½ minutes both inlet and outlet thermometers are read and the temperature of the surrounding air is taken. The test usually runs for 20 or 30 minutes, and the readings are averaged. By referring to the following tables showing the specific heat of water at different temperatures the number of heat units in the quantity of water entering the radiator is found, and also the heat units in the same quantity at the temperature it leaves the radiator. The difference shows the number of heat units dissipated from this quantity of water during the test.

Calculated by means of Regnault's formula, $C = 1 + 0.00004T + 0.0000009T^2$, in which C is the specific heat of water at any temperature T in centigrade degrees,

the specific heat at freezing point being 1. The table is as follows:

Temperatures		British thermal units per lb. above 32° F.	Specific heat at the given temperature.	
Cent. Deg.	Fahr. Deg.			
0	32	0.000	1.0000	
10	50	18.004	1.0005	1.0002
20	68	36.018	1.0012	1.0005
30	86	54.047	1.0020	1.0009
40	104	72.090	1.0030	1.0013
50	122	90.157	1.0042	1.0017
60	140	108.247	1.0056	1.0023
70	158	126.378	1.0072	1.0030
80	176	144.508	1.0089	1.0035
90	194	162.686	1.0109	1.0042
100	212	180.900	1.0130	1.0050
110	230	199.152	1.0153	1.0058
120	248	217.449	1.0177	1.0067
130	266	235.791	1.0204	1.0076
140	284	254.187	1.0232	1.0087
150	302	272.628	1.0262	1.0097
160	320	291.132	1.0294	1.0109
170	338	309.690	1.0328	1.0121
180	356	328.320	1.0364	1.0133
190	374	347.004	1.0401	1.0146
200	392	365.760	1.0440	1.0160
210	410	384.588	1.0481	1.0174
220	428	403.488	1.0524	1.0189
230	446	422.478	1.0568	1.0204

Efficiency depends upon a great number of different factors, the greatest of which is material used. In a finned radiator the piping may be of a lower conductivity, as brass, but the fins of the highest possible conductivity, which means copper. Comparing costs, however, the cheapest possible radiator to make will have metal fins, such as steel coated with lead, and will be larger and heavier than if the fins are of copper.

Fins should be roughed up, preferably with perforations, in order to break up the air cushions. Fins should be soldered to the tubes. As copper, while high in conductivity, is low in convection, the whole should be coated with lampblack, which is very high in convection. The shallower a radiator is from front to back the more efficient it is per pound. Radiators should be placed where they have a free air exposure.

Up to a certain limit, the faster water is passed through the radiator the more efficient it is. This means primarily big connections, also a pump powerful enough, yet the pump should not be so powerful as to force water out of the overflow. If a radiator is of large size, do not neglect to use connections large in proportion. The piping should be equivalent to the capacity of ½ inch for each 7 or 8 horsepower. A pipe that goes up, then down, having no vent at the high point, may form a steam trap unless the radiator is amply large.

The relation of heat to horsepower is only approximate. Every motor must be fitted by testing of samples. A hot weather test is by far the best. For an indoor test with the temperature at 75, without fan, starting with cold water, the car should be run approximately half an hour before the radiator boils over. Using fan, it should run indefinitely.

Most radiator manufacturing companies have either formulæ or tables showing the size of radiator adaptable to certain types.

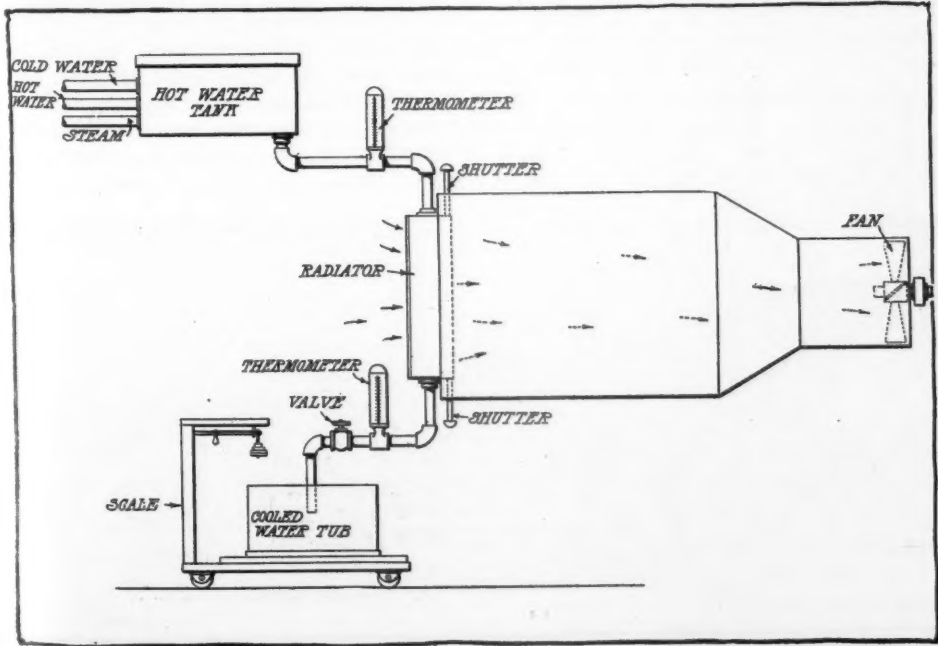


FIG. 2—MEANS OF TESTING RADIATORS, EMPLOYED BY BRISCOE MFG. CO.

One Winton Six for 1912

Design of 1911 Continued and Only a Few Minor Changes Made—Adjustable Pedals and New Universal Are Features

Larger Front Tires and Booth Demountables Are Used

The extra space obtained by the additional 6 inches has been made use of by giving more foot room to the front-seat passengers and adding length in the tonneau. A further body change is that the fore-door now is standard throughout, as compared with this year when it is listed as an option.

A body improvement that appears on a first glance of the car is the equipment of electric dash lamps which are carried inside of the hooded dash, the only external indication of the lamp being the glass which is flush with the front of the dash. Both headlights and tail lamps are combination oil-electrics. A most noticeable body change, but one which does not appear in the illustration, is increase in the upholstery for both front and rear seats. This is shown in an illustration on another page. The cushions are of special thickness and tilt rearward, thereby eliminating that unpleasant tendency of slipping forward off the seat which is so common with the flat cushion. The front seat upholstery is similarly arranged. In practically all other respects the body lines remain the same as heretofore.

Demountable Rims Used

A further change the observer readily notices is the equipment of demountable rims on front and rear wheels, the Booth rim being fitted as standard. In this connection there is still another alteration, namely, that 4½-inch tires are used on the front wheels where 4-inch sizes have been used in 1911. For 1912 the tire sizes are 36 by 4½ all round.

Passing from the body consideration to those of the motor and chassis in general, it is discovered that the motor remains

practically as it is this year. It is a six-cylinder design, using L-type cylinders cast in pairs, with the valve springs and push-rods enclosed by large rectangular plates. The cylinder measurements, 4½-inch bore and 5-inch stroke, give a S.A.E. formula rating of 48.6 horsepower and the piston displacement is 477.2 cubic inches. These measurements have not altered since June, 1907, when they were introduced by the Winton company. There is one minor change in conjunction with the motor and that is the fitting of a new coupling between the water pump and the magneto which coupling is of the jaw type and has been improved by the addition of a take-up device whereby any looseness can be taken up.

The ignition remains as this year, namely, the dual system with an option given on a Bosch or Eisemann magneto.

Motor cooling is by a pump system, with a new design of cellular radiator.

In the carburetor system the Stromberg is used. The main gasoline supply is carried under pressure in a tank at the rear of the chassis. The gasoline is forced through a small tank on the dash having a capacity of 1 pint. In this tank is a float which regulates the level, maintaining it constantly. From this tank the flow is by gravity to the carburetor.

The lubrication system remains unaltered. It is a double pump system. Two plunger pumps are operated by eccentric from the rear end of the crankshaft. One pump draws oil from the reservoir at the left rear of the motor and delivers it to the four crankshaft bearings, the other draws the oil back from the motor to the reservoir. The crankshaft is drilled and the oil feeds direct from the four bear-



FIG. 1—WINTON ADJUSTABLE PEDALS

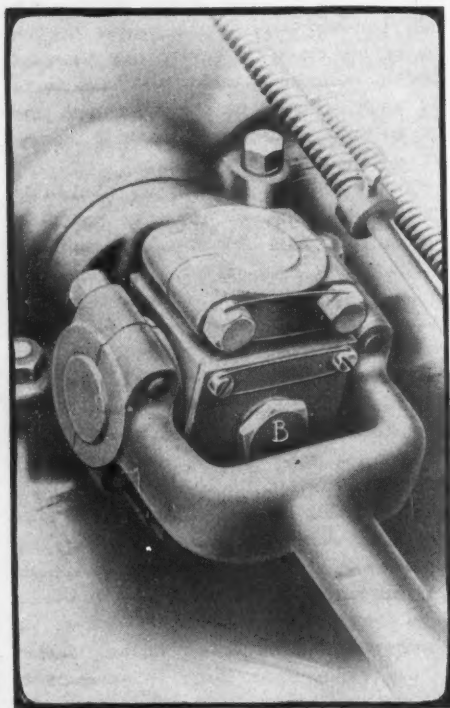


FIG. 2—NEW WINTON UNIVERSAL

FOLLOWING its custom of previous years, the Winton company is producing but one chassis model for 1912, which is a 48.6-horsepower six-cylinder car, built along practically the same lines as the car of this year. There are a few minor changes, but in the majority of respects every characteristic Winton feature has been maintained. The car's general appearance has been enlarged by the addition of 6 inches to the wheelbase, which this year measures 124 inches, but which will be 130 for 1912. This same wheelbase measurement is used on all models whether touring car, roadster, or limousine.

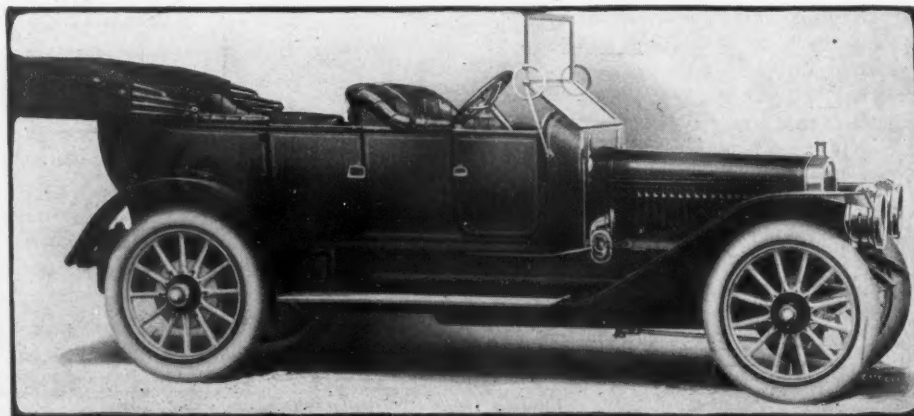


FIG. 3—WINTON STANDARD FIVE-PASSENGER TOURING CAR FOR 1912

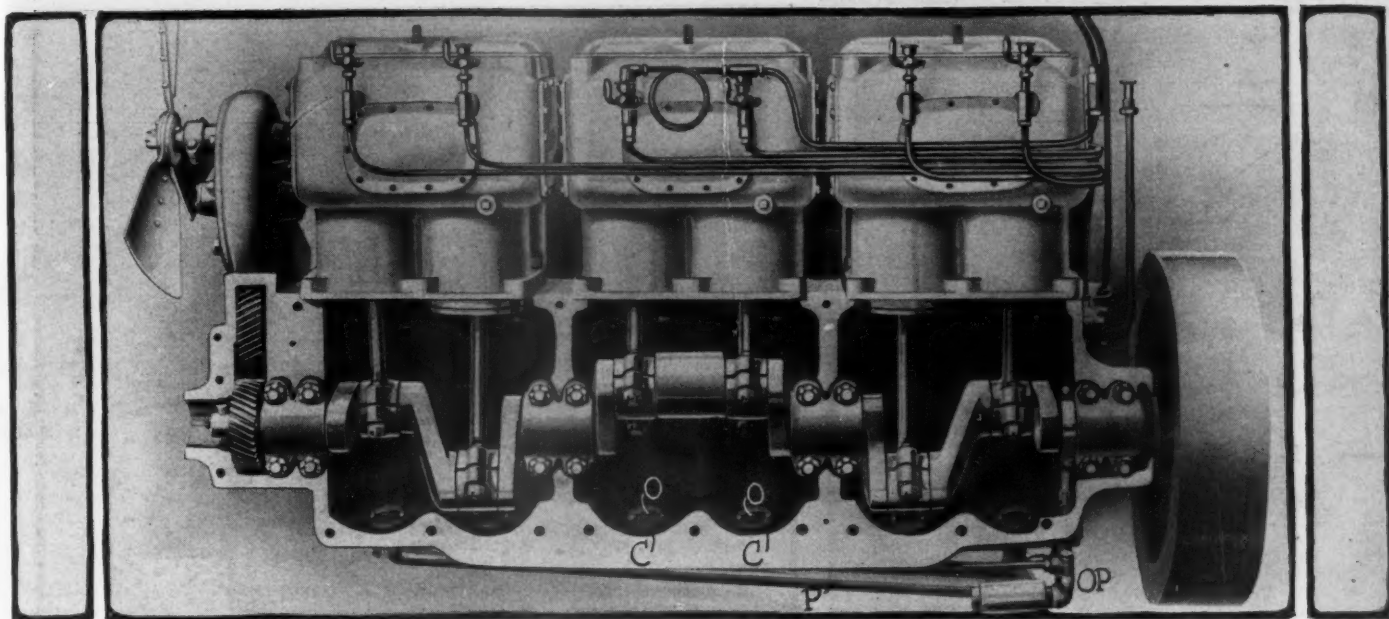


FIG. 4—WINTON 1912 SIX-CYLINDER MOTOR SHOWING OILING SYSTEM

ings to the lower ends of the connecting rods. The overflow oil lubricates the cylinder walls and the splash assists in this work. As shown in Fig. 4 there is a small compartment C beneath each connecting rod, in which an oil pool $\frac{1}{2}$ -inch deep, or thereabout, is maintained. When it reaches this level the oil overflows into a collector pipe P which is outside of the crankcase and drains back to the oil pumps O, P. Here the oil is filtered and the second pump forces it back to the oil tank already referred to; there is, thus, a continuous circulation splash system with the oil filtered between successive circuits. This system has been used by the Winton company since the introduction of its six-cylinder motors.

Self-Starter Continued

One other characteristic Winton motor feature, which must not be overlooked, is the self-starter, made standard on all models. It is a compressed air system in which air is stored in the pressure tank carried on the left side of the chassis, the pressure being maintained by an air pump on the motor. From this tank one pipe leads to an air-distributor, there being six pipes connecting this distributor with the six cylinders. When it is necessary to

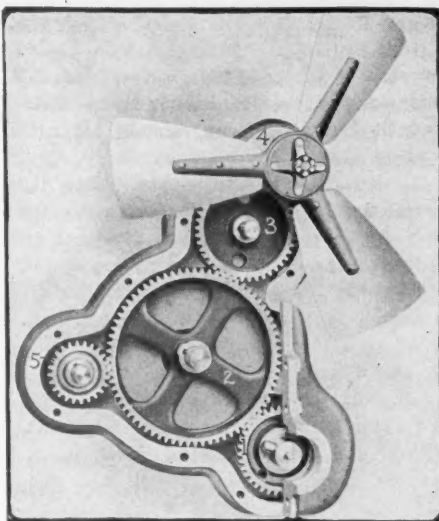


FIG. 5—WINTON FAN DRIVE, PINION 1 ON CRANKSHAFT; 2, CAMSHAFT; 3, IDLER; 4, FAN; 5, MAGNETO SHAFT

start the motor the driver presses a push button on the dash which allows the air

pressure to flow through the distributor and into the cylinder which is the firing position. Pressure forces this piston down and if the first cylinder fails to fire the air-distributor sends the pressure to the next cylinder in firing order. There is but one continually moving part in this self-starter, namely, the distributor valve. On the dash is a gauge which shows the amount of pressure in the air tank.

Regarding the constructive details of the Winton motor, little may be said. It has, however, a few characteristics, one being the vertically-divided crankcase. The majority of the motors have the crankcase made in halves, upper and lower with a horizontal dividing line. The Winton is divided in halves but the dividing line is vertical, so that the crankcase has right and left halves instead of upper and lower. The bearings are so mounted, as illustrated in Fig. 4, so that one-half of the case can be removed, exposing the entire crankshaft without interfering with the adjustment of a single bearing.

As heretofore used, the offset crankshaft is continued in 1912. The offset is approximately 15 per cent of the stroke, the object of such offset being that the angularity of the connecting rod is reduced

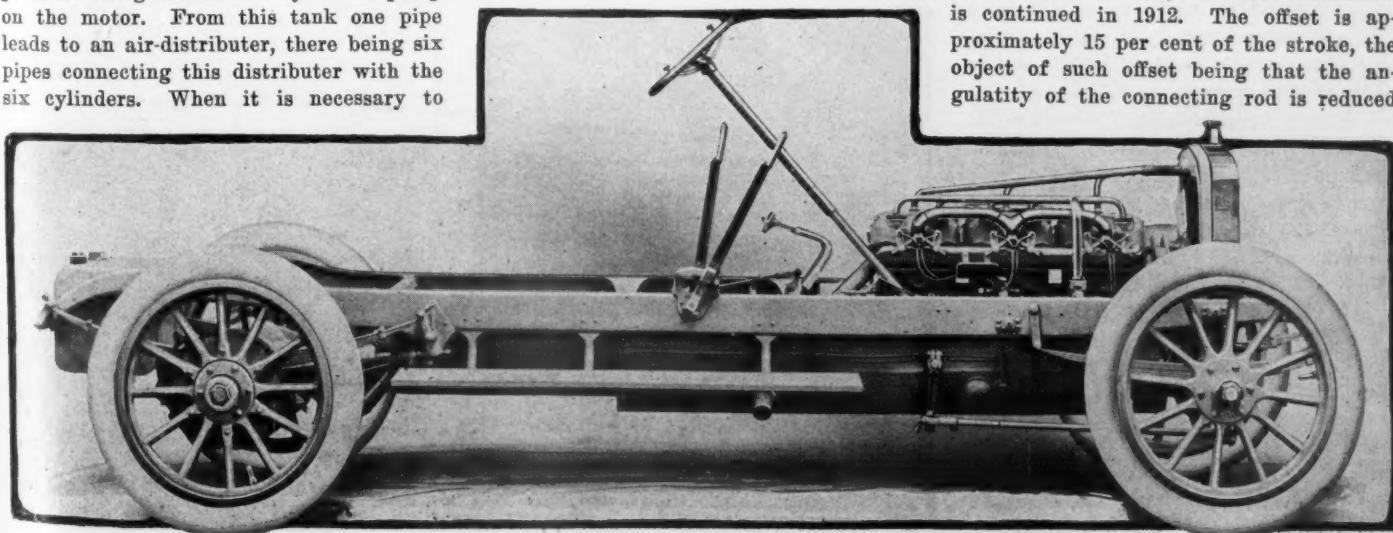


FIG. 6—SIDE VIEW OF WINTON 1912, SIX-CYLINDER 48.6-HORSEPOWER CHASSIS

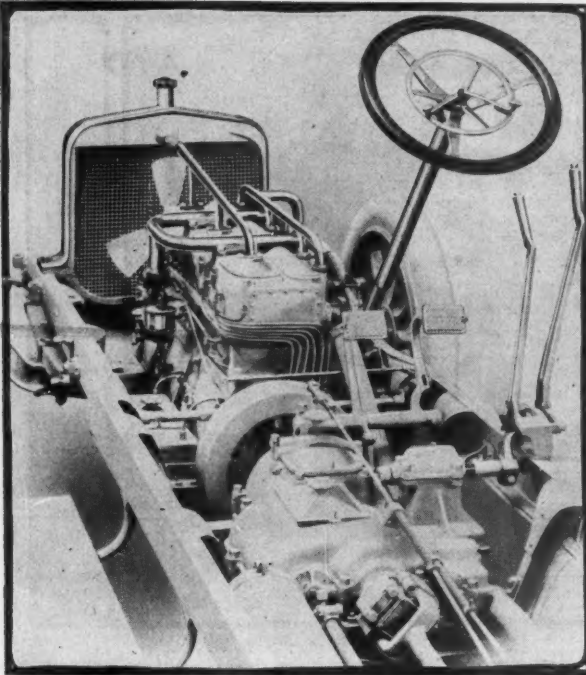


FIG. 7—CHASSIS ASSEMBLY ON 1912 WINTON SIX

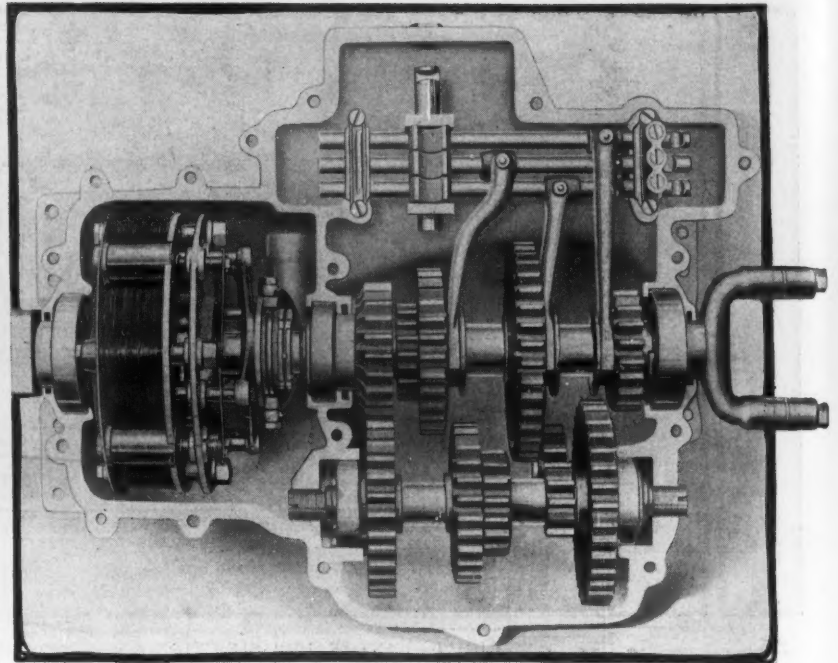


FIG. 8—FOUR-SPEED GEARSET OF WINTON

on the explosion stroke, which is the period of greatest side pressure of the piston against the cylinder. With an offset crankshaft the angularity of the connecting rod on the exhaust and compression strokes is greater, but the work done by the piston on these strokes is not to be compared with that of the explosion stroke, so that the added side pressure is of little consequence.

In reviewing the transmission system of the Winton a few changes are found. There are two that must not be overlooked; the first is the installation of adjustable brake and clutch pedals, illustrated in Fig. 1. The foot piece of each pedal is carried on a rod with serrations S, this rod telescoping with the tubular pedal shaft, which shaft is split and a pinching bolt B provided to clamp the pedal at any desirable point. A total range of adjustment of 4 inches is obtainable. The second transmission improvement is the adoption of a new universal joint in rear of the gearbox, which joint, Fig. 2, is claimed to be entirely oil proof, the lubricant being put in through the plug B. The exact details of this joint are not known.

The Winton Transmission

In other respects the Winton transmission remains unaltered. The multiple-disk clutch is a unit with the gearbox, as Fig. 8 shows, the clutch occupying a separate compartment at the front end of the case. In order to insure immediate release of two sets of disks, a slight improvement has been added by a ridge in each disk, this ridge forming a spring, so to speak, between it and the adjacent disk. When the clutch is engaged, these ridges are compressed but immediately the clutch is disengaged the spring action in them separates the disks.

The Winton gearset is a four-speed design with direct drive on third, the ratio

of which is 3.2 to 1, that is for every 3.2 revolutions of the crankshaft there is one revolution of the rear wheels. Fourth speed is indirect and is geared $2\frac{1}{2}$ to 1 of the motor. The illustration shows the general layout of the gearset with the three shifter rods enclosed in a lateral extension of the case; and an oil-proof wall between the gearset compartment and the clutch compartment which allows of the use of an oil suitable for the clutch, and another oil suitable for the gearset without any danger of the two intermixing.

The rear axle system remains unaltered. Internal and external fabric-faced brakes are placed on the rear wheels. In general design the frame is as it is at present, being lengthened to accommodate the increase in the wheelbase. The frame support is through a set of vanadium steel semi-elliptic springs.

In the matter of equipment provision is

made on the gearbox whereby a Gray & Davis dynamo for electric lighting can be fitted so as to drive from constant speed gear of the set.

KING FENDER SYSTEM

A novelty in fender construction is the method employed by the King Motor Car Co., in which the front fenders and acetylene headlights and license tag are mounted as a unit, as illustrated in Fig. 13. The side aprons instead of being fashioned to the side of the frame are made with a right-angle piece which lies flat on top of the frame. The sides of the bonnet rest on this piece instead of on the usual polished wood panel. A hollow steel tie tube T steel connects the fenders and supports the headlights direct, thereby eliminating brackets. This tube is carried high so that the lamps are out of the way of the starting crank. With the lamps lo-

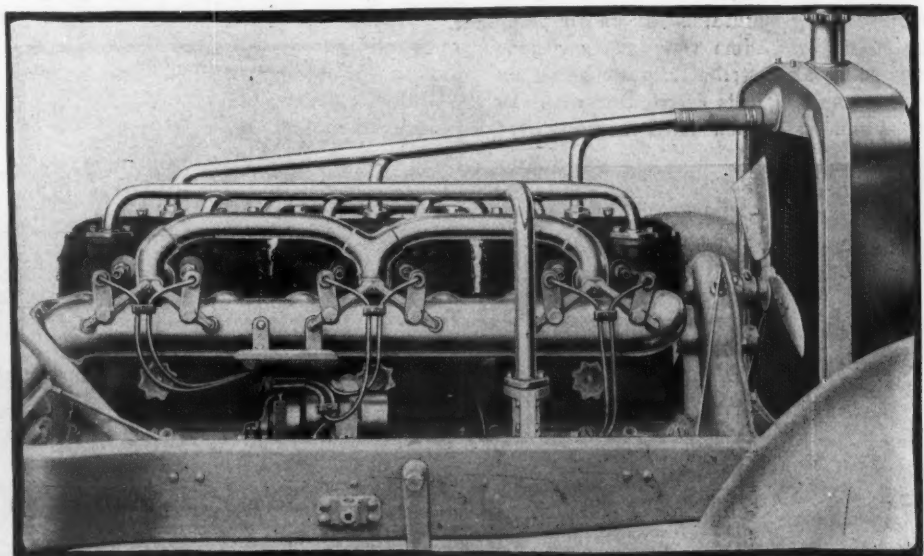


FIG. 9—MAGNETO SIDE OF 1912 WINTON SIX

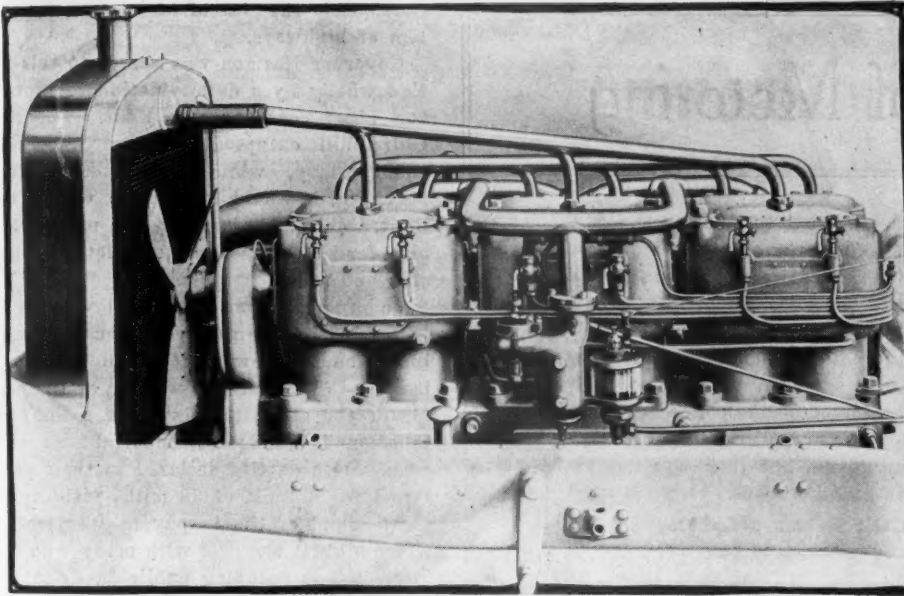


FIG. 10—INTAKE SIDE WINTON SIX WITH SELF-STARTER AIR PIPES

cated at this height the road shadows are reduced. The hollow tie tube T acts as a gas pipe for the lamps. The gas hose from the gas tank to the lamps is replaced by a hollow wire carried in a crevice in the mud guard; and back of one of the lamps is a valve for turning on the gas. The gas tank valve can be left under pressure at all times and the closeness of the valve to the lamp makes the lighting of them an easy problem.

MOTOR CAR LITERATURE

Charles E. Miller has issued his 1911 catalog, No. 19, consisting of 256 pages of motor car, motor boat, motor cycle and monoplane accessories. Each article is illustrated with a price list.

"The Book of Bibendum," in two volumes, deals with the care and repair of

pneumatic tires. The causes of deterioration of tires, tubes and rims are discussed and remedies suggested. Published by the Michelin Tire Co., Milltown, N. J.

"Motoring Across a Continent" is the title of a booklet recently issued by the Premier Motor Mfg. Co., Indianapolis, Ind., which is a résumé of the trip of the Premier car last year from New York to San Francisco.

The Washington Auto Supply Co., Washington, Ill., has recently issued a 7 by 10 catalog listing and describing various motor car accessories.

Frank Mossberg Co., Attleboro, Mass., has recently mailed to the trade its new circulars describing its various line of wrenches.

"Across the American Continent with the Ohio Pathfinder" is the subject of a 100-paged, paper-covered book, published by the Ohio Motor Car Co., telling the story of the trip of the Ohio car in path-finding the southern transcontinental route from New York to San Francisco. A complete town-to-town itinerary with running directions is given of the route from Atlanta, Ga., to San Francisco, Cal.

WELCH-DETROIT MODEL W

Model W is the new four-passenger toy tonneau car with detachable fore doors which is being marketed by the Welch Motor Car Co. The car as illustrated is a straight-line design and hung low by the use of long semi-elliptic springs and having front and rear doors of the same height. The use of flat top fenders accentuated the low hung appearance of the car. The chassis is the regular Welch-Detroit type employing 40 horsepower, four-cylinder T-head motor 5-inch bore and 5-inch stroke. The wheelbase measures 122 inches and tires are 36 by 4-inch in front and 36 by 4½-inch in rear.

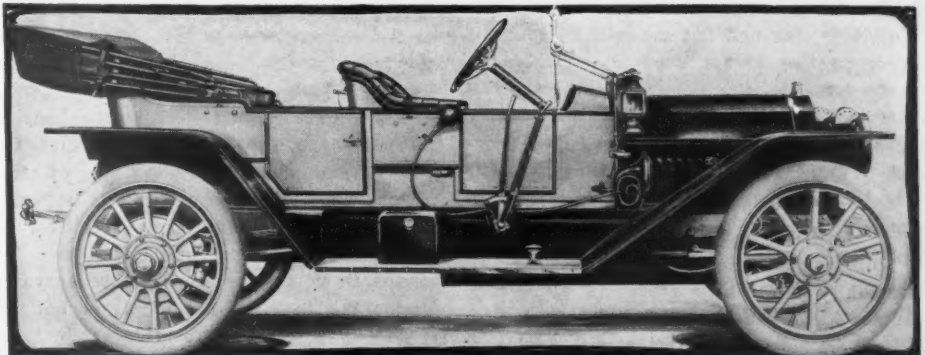


FIG. 12—WELCH MODEL W TOY TONNEAU

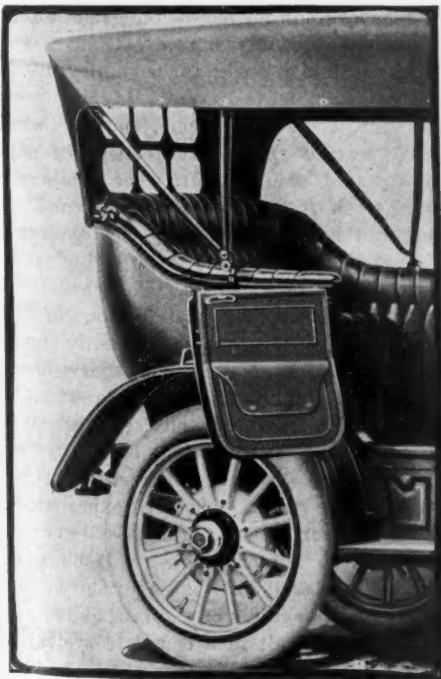


FIG. 11—WINTON SIX WITH SPECIALLY DEEP CUSHIONS AND UPHOLSTERY

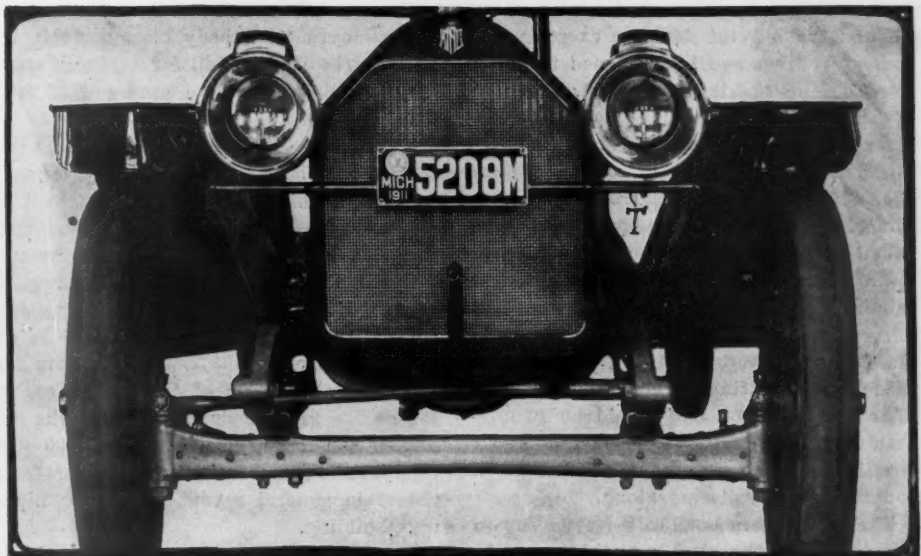


FIG. 13—FRONT FENDER DESIGN ON KING CAR

Legal Side of Motoring

Bay State Wants Lights

THE lower house of the Massachusetts legislature did a flip-flop last week and passed the bill that provides for all vehicles using the roads at night to carry some sort of a light. It was not put through to be engrossed without a hard fight. The committee originally turned it down but Senator Hibbard, chairman of roads and bridges committee, managed to get it substituted in the senate and it passed that body. Representative Alvin E. Bliss, who is a member of the legislative committee of the Massachusetts State Automobile Association, tried to have the lower house do the same thing shortly after the committee reported adversely on it, but he got scant recognition. The house would not even give him a roll call. When the bill came down from the senate, however, it had a fighting chance and some of its friends got busy.

The debate was lively and it soon was seen that the tide was turning in its favor. The men who were out to knife it were amazed at the sudden strength in favor of it and it seemed the more it was opposed by Representative Willetts, who was for it a year ago but made a switch this year against it for some apparently unknown reason, the more advocates the bill secured. It went sailing along and finally was engrossed. Now it is up to the governor, and it is expected that he will sign it.

Object Lesson in Boston

Police Commissioner Stephen O'Meara of Boston was recently given an admirable object lesson on the antiquated means of patrol wagon transportation still employed in Boston, and it may be the means of bringing about more modern equipment. The commissioner has a habit of walking about town a great deal for exercise, and a few evenings ago he happened to notice a policeman making an arrest. The officer belonged to one of the downtown stations and as he rang in the box the commissioner pulled out his watch. It was then 8:55. At 9:12 the patrol wagon came lumbering along at an easy gait, having taken 17 minutes to come a distance of approximately $\frac{1}{2}$ mile. The commissioner inquired about it and was told that the horse was an aged animal and he could not do any better. Allowing for all sorts of delays in getting harnessed and started of, say, 7 minutes, that would be 10 minutes going a distance at the rate of about 2 miles an hour or about as fast as a person usually saunters along.

The newspapers have called attention to the fact that the city has wide areas in the suburbs where better protection is

needed, not to mention the downtown section, and there is not a motor patrol wagon in the entire department, while the fire and hospital departments have a large number. The matter also will be called to the attention of Mayor Fitzgerald, and it is expected that motor equipment will be forced on the police department. There are a few police motor cars used to chase motorists, but these are not as important as patrol wagons.

Calls Driver a Laborer

The Massachusetts supreme court handed down another decision last week of interest to motorists in which he says that in the eyes of the law operators of motor cars are laborers. The decision came as a result of the suit brought by the widow of George J. Buckley who sued the Dow Portable Electric Co. for the death of her husband. Mr. Buckley was fatally injured while riding in one of the company's motor cars. The decision in the superior court was against her, and she took exceptions to it, basing the exceptions on the claim that Alvah Dow, superintendent of the company, was operating the motor car when the accident happened, and that therefore the company was liable under the terms of the liability act for the carelessness of a superintendent.

The supreme court says in its decision affirming the superior court verdict for the defendant: "The driving of the motor car in question was not superintendence, but manual labor. It involved no element of supervision. In this instance Dow was merely a fellow servant. Under the law the defendant is not responsible in damages for this conduct insofar as it affects a fellow laborer."

Ohio Road Bill Vetoed

Governor Harmon of Ohio dealt the good roads movement a body blow recently by vetoing the Hudson bill for a $\frac{1}{2}$ mill state levy, which would have produced \$3,250,000 on the estimated grand duplicate of the state of \$6,500,000,000, and vetoing the section of the McGuire highway department bill which increased from 1 mill to $1\frac{1}{2}$ mills the maximum county road tax. The increase was expected to add an additional \$3,250,000 to the funds for good roads. He also vetoed the repealing section of the McGuire bill, the effect being to restore the present 1-mill maximum for the county's portion of the cost of carrying on the good roads movement. The appropriation bills also carry \$44,000 for this year and as much for next year from the state general revenue fund for highway building.

The net effect of the vetoes is to check the good roads movement and to postpone

indefinitely the plan of an intercounty system of highways.

Governor Harmon was stirred to this action wholly by a determination to protect the 1 per cent tax rate limit. The McGuire bill excepted the entire $1\frac{1}{2}$ -mill county levy, while the Hudson state levy, which would have come within the limit, would have left only $9\frac{1}{2}$ mills available for all other county, municipal, township and school purposes.

Governor Harmon argues the case as to both bills in his message on the McGuire bill, which follows: "Of all the steps looking to the material welfare of the people of the state, the fixing of a limit of taxation is the most important at this time. Both parties declared in their platforms for a limit of 10 mills, yielding to the demand of the taxpayers everywhere. After a great struggle with many who are interested in spending public funds rather than in safeguarding the purses of the people, a law has just been passed fixing that limit. The wish of those who opposed it now is to break down this wholesale measure and have the old order of things restored. The determination of every friend of economical administration should be, and I believe is, to resist all attempts to gratify that wish."

State Aid In Wisconsin

The Wisconsin good roads bill, carrying an annual appropriation of \$350,000 for highway construction, improvement and maintenance, has passed both houses of the legislature and with the signature of the governor, pledged by the Republican party platform, doubtless will become a law this week. The bill was fathered by Senator J. S. Donald, of Mount Horeb, Wis.

This is the first time that state aid for highways has become a fact in Wisconsin. In the past, road work has been rather haphazard, although the creation of the position of county highway commissioner had a salutary effect for several years.

The law creates a state highway commission of five members, one of whom shall be the dean of the college of engineering of the University of Wisconsin; the second, the state geologist, and the other three appointees by the governor. They will receive no salary, but reimbursement for expenses. The commission will supervise the distribution of the \$350,000 fund provided annually under the law and have exclusive supervision in relation to highway work in the state. It will employ engineers, advise counties regarding the construction of roads and bridges, make rules for carrying out surveys and plans, conduct experimental work, apportion the fund, and compel counties to lay out their roads on a coordinate plan. This is regarded as one of the best features of the law, as it eventually will result in a complete system of state highways in Wisconsin.

The county is the unit in the distribution of the fund, and the law requires

that the state shall bear not more than one-third of the cost of good roads work. The county and its townships must each contribute a third. If the whole \$350,000 is expended each year, it will mean a total expenditure of \$1,050,000 for highway improvement annually.

All county work shall be done under the direction of a county highway commissioner, whose salary will be \$1,000 a year. All road plans must originate in the county boards and then approved by the state commission. Before the state pays its share of the cost, however, the work done by the county must pass muster under inspection by the commission.

A good feature of the law not originally contained in the Donald bill is the provision permitting county boards to use at least 10 per cent of the allotment for maintenance of highways. The amendment is by Assemblyman Gilboy, who pointed out that unless a road is maintained after it is improved or constructed the money is practically wasted.

Washington Laws

In brief the new motor law of the state of Washington is as follows:

Registration—Non-residents need not register, providing they have complied with the laws of their residence requiring the registration of owners of cars and that they display the license tag or marker of such state upon the back of the vehicle at least.

Equipment, 1—During the hours of darkness show at least one lighted lamp conspicuously placed showing white to front and red to rear.

2—A muffler must be used and not cut out or disconnected within the limits of any city.

3—Good and efficient brakes.

4—Bell or horn must be sounded whenever there is danger of an accident.

Speed regulations, 1—Within thickly settled or business portions of any city or town do not exceed 12 miles an hour.

2—Over any crossing, sidewalk, crosswalk or street intersection within limits of any city or town when any person is upon it, do not exceed 4 miles per hour.

3—At any other place do not go faster than 24 miles an hour.

4—Never go at any unsafe or unreasonable rate, having proper regard for safety of others.

Stop when—If horse appears frightened reduce speed, and stop if requested by signal or otherwise by person in charge.

Rules of the road—Usual rules of the road. Exercise every reasonable precaution to prevent frightening of horses.

Local ordinances—Local authorities cannot exclude properly registered vehicles from the highways nor require any other license except for vehicles for hire. Cities of the second class may regulate the speed of motor cars. It has been decided that a city may limit the speed to 6 miles an hour under the motor law of 1905.

Penalty—Fine, not exceeding \$100.

The Motorists' Bookman

ONE of the recent motoring novels is "Prince or Chauffeur," with fashionable Newport as its setting, by Lawrence Perry. A young naval officer, who is the inventor of a steering torpedo, discovers that the most important detail of his invention has been stolen, and a Russian nobleman, the guest of one of Newport's millionaires, is suspected of the theft. To hunt down the thief the American officer takes up the calling of chauffeur and succeeds in being employed in the household of the millionaire. How this young naval officer foils the nobleman's schemes, the part played by the millionaire's daughter and her thrilling experience aboard a United States destroyer furnish sufficient situations to make an interesting story of love and adventure. A. C. McClurg & Co., Chicago. Price, \$1.35.

English Road Map

The motorist desiring to be freed from the annoyance and trouble of unfolding and folding a large road map will find the Autocar sectional road map of England and Wales of great convenience. The map consists of twenty-four separate loose sections encased in a gray waterproof envelope. Each section is numbered and a key map is printed on the back of every section. The size of the case is 8 by 9 inches and the scale is 8 miles to the inch. Published by the Autocar Co., 20 Tudor street, London, England.

A Rational Banking System

Recognizing that the banking system of the United States is full of defects, causing panics and loss to the commercial interests of the country, H. M. P. Eckardt, a retired banker, has written a comprehensive book on the advantages of the branch bank system. Briefly stated, he says, the object of the book is to gain friendship for the branch bank idea in this country. Several important banking evils are pointed out which are seen in no other great country. The book is well classified and covers all the important features of the banking business. He adds that the system is a success in other countries but is not looked kindly upon by American country bankers. Published by Harper & Brothers.

Michelin Motor Guide

"The British Isles" is the name of the first volume of the 1911 series of Michelin guides issued by the Michelin Tire Co., Ltd., London. It is a 4 by 7½-inch, 552-page volume packed full of touring routes and other valuable information for the motorist intending to tour the British Isles. Part I is given over to Michelin information; Part II is devoted to ten excursions in England, four in Scotland,

and seven in Ireland. A diagram map showing the complete itinerary of each separate excursion accompanies each tour outlined. Some of the English sections covered are: the lake districts, the York coast and the dales of Yorkshire, Yarmouth and the Norfolk broads, Hereford, Gloucester and the valley of the Wye. In Scotland, Inverness, the valley of the Dee, etc., and then Ireland with its Giant's Causeway, the lakes of Galway and the west and southern coast of Galway, Dublin, Belfast, and the region of Killarney. Colored maps showing the main and through routes, as well as the picturesque roads are included. The book is most valuable in every respect.

Book of Nature Studies

Whether we call ourselves easterners or westerners, Stanton Davis Kirkham in his book "East and West" says that we are primarily Americans and our inheritance is the length and breadth of this beautiful land with its varied scenery; that it is most fitting we should now and then look over the estate and not content ourselves with our own little corner of it. With this object in view the author points out the contrasts of the eastern possessions with the western. He has chosen Massachusetts and New York to represent the east, while California and Arizona stand for the west. Being a great lover of nature he has made the volume attractive and instructive. He says, "Climate is not the only thing that lures westward each winter, but there is something in the western country capable of satisfying that in us which the east forever leaves unsatisfied. Broadly speaking, the charm of the east is pastoral, of the west heroic." This nature study imparting information about the birds and animals as well as the plants indigenous to the different regions should appeal to the nature-loving motorist. G. P. Putnam's Sons. Price, \$1.75 net.

Motoring Road Rules

Neal Dow Decker in his thin little volume of pocket size, entitled "Road Rules and the Law of Automobiles," deals with motor legislation in the various states of the Union and the eastern provinces of Canada. A handy little reference book to carry in one's car, as it contains in condensed form information on all the reciprocal laws of the states and data in convenient form on the speed and equipment regulations in the states and Canada. Some of the chapter titles are: Operation of motor vehicles on public highways, equipment of motor cars, registration of motor vehicles, employer and chauffeur, motor car insurance, rights of motor vehicles on ferries and steamers, etc. Published by Erle W. Whitfield, New York. Price, \$1.

OIL for Madison's Streets—The city of Madison, Wis., has purchased 50,000 gallons of asphaltum oil for street and road purposes. Last year's experiment was very satisfactory.

Order Signposts Erected—The commissioners of Butler county, Pennsylvania, have ordered index signposts to be placed on every cross road in that county. Failure to comply with this order will result in the immediate prosecution of all road supervisors guilty.

Sent to Prison—Prison sentence for speeding a motor car was pronounced for the first time in the history of Portland by Judge Tanzwell. The defendant was T. B. Barde, who drove his machine into a crowd on a congested corner, injuring one man, causing a panic and going on without paying any attention. The imprisonment will be 15 days in jail, but no fine.

Roosevelt Member of Touring Club—Ex-President Theodore Roosevelt, who is rapidly becoming an enthusiastic motorist, has accepted the invitation extended by Secretary F. H. Elliott, on behalf of the Touring Club of America, to become an honorary member of that progressive organization. A tour covering a period of several days through lower New England has been prepared for Colonel Roosevelt by the route experts of the club.

Run Called Off—The contest committee of the Quaker City Motor Club has called off for the present the run for electric pleasure cars scheduled to take place Saturday, June 17. Generally unsettled weather conditions prompted this action on the part of the club officials, and owing to the absence of many members from the city it is altogether unlikely that another date will be set until early in the fall. The Fairmount park road race, although nearly 4 months off, is already a topic of interested discussion. Active preparations for the race will be taken up in the not far distant future. This classic will be held on Saturday, October 7.

Blazing a New Trail—With the object of establishing a more direct motor route between eastern and pacific coast cities and one which will take in the scenic attractions of the Rocky Mountains, William A. Peck, of Moline, Ill., left that city Monday, June 19, in a Midland F. His running schedule calls for 2,528 miles in 132 running hours and the trip to San Francisco, it is figured, will require 11 days. The route which Peck is mapping out cuts out many miles of detours and crosses the continental divide of the Rockies by way of Tennessee pass. Iowa will be crossed along the river-to-river road, and from Omaha the Union Pacific railroad will be closely followed to Denver. From this point a new trans-continental trail will be routed to Salt Lake City. From this point the route will be around the southern end of the lake to Ely, Nev. Reno will be touched and

the remainder of the trip will be by way of Truckee, Lake Tahoe, Sacramento, Oakland and San Francisco. There will be no night travel.

Planning Big Parade—The Automobile Club of Seattle has sent out invitations to all clubs and individuals on the Pacific coast to meet in that city and take part in the floral parade to be held in Seattle July 17-22, during Golden Potlatch week.

Election at Omaha—At the annual meeting of the Omaha Automobile Club the following officers and directors were elected to serve during the ensuing year: E. H. Sprague, president; W. R. McKeen, first vice-president; Gould Dietz, second vice-president; L. C. Nash, secretary and treasurer; Ed. George, Rome Miller, Frank Furay, S. A. Searle and Dr. Lord, directors.

Club Buys Road Drags—The Mercer County Automobile Club at Sharon, Pa., has decided to purchase a number of road drags and install them in different parts of the county, in order to demonstrate to the road supervisors what good can be accomplished by their use. J. M. Campbell is director of the federation in Mercer county and is arranging to get its full share of the recent immense state appropriation for the good roads work.

Governors Will Participate—Members of the Automobile Club of Minneapolis will join those of the St. Paul club Friday on the first social tour the two organizations have ever held jointly. Accompanied by Governors Eberhardt of Minnesota and McGovern of Wisconsin, they will drive to Taylors Falls, a beautiful summer resort in Minnesota, to witness the dedication of a new free bridge over the St. Croix river. It is expected that 100 cars will make the trip. Following the ceremonies, a picnic lunch will be served. The motorists will return by way of the St. Paul club's country home for dinner. They then will drive to Minneapolis haphazard.

Bay States Enjoy Themselves—The annual outing of the Bay State A. A. took place last Saturday and Sunday, when a party of about 150, many of them Boston dealers, motored to the Hotel Sippewissett, Falmouth, Mass. The members did not start together, but before they reached Bridgewater, half way there, many of them met on the main highway and motored along as one large party. The weather was ideal and everyone arrived early enough to join in the big clambake provided for them just after midday. Then followed the annual ball game. There was also a series of swimming events during the afternoon. In the evening a banquet was served, at which President E. A. Gilmore presided. Dancing followed. Sunday many took motor

trips to places of interest about the cape section and then started home, while others remained over until Monday morning.

Starts Good Work—The Automobile Club of Minneapolis last week erected the first signpost of a series to be installed in Hennepin and adjoining counties. Several thousands of dollars will be expended in this and in good roads work before the end of the season in the hope of having that portion of the state thoroughly routed by fall.

Columbus After Members—The Columbus Automobile Club, of Columbus, O., has started an active campaign for membership and to that end the following have been named on a special committee to secure new members: Henry Supp, Edward Loeffler and J. C. Kimmel. It is announced that the new quarters of the club in the Virginia hotel will be ready for occupancy July 1. Orphans' day will be postponed until after the club occupies its new quarters.

Indiana Road Work—Indiana state officials have recently completed statistics of the amount of road work done during 1909. These figures show that \$30,775.39 was spent in surveying and joint viewing and that \$1,257,979.70 was spent for gravel road repairing. There were constructed \$1,035,370.27 for new bridges and 1,060 miles of free gravel roads were built. There is considerable regret over the fact that at the recent session of the legislature a law was not passed placing the building and repair of roads under state control.

Hill-Climb for Maryland—The Automobile Club of Maryland will hold a hill-climb on the Belvidere hill, Mount Washington, on July 1. It originally was intended by the club to hold this event in the fall, but the change in schedule was made at the urgent request of members and others interested. The climb will be under the sanction of the American Automobile Association. It is further announced by the hill-climb committee that if enough entries can be secured among members and others, the committee would establish an individual owners' class.

Swops Barber Shop for Car—A peculiar trade was quickly consummated at Lefe Arthur's livery barn in Wellston, Ohio, recently. John Kuhn went around to the barn, in front of which stood Vernon Pittenger's motor car. John was looking over the machine when Vernon came out of the barn. "What will you give me for it?" asked Pittenger. "My barber shop," replied Kuhn. "Give me the key," were Vernon's next words, and without reply Kuhn tossed it over. When the barber went around the street he had no idea of becoming the possessor of a

From the

Four Winds

car, nor did Vernon expect to enter into the tonsorial business, so that in less than 5 minutes a trade involving between \$2,000 and \$3,000 was made.

Caught by Assessor—During the recent parade held in Portland the deputy county assessors discovered there were many new cars which had not been listed on the assessment rolls. Deputy County Assessor North has advised the delinquent owners that unless they submit to him statements of the value of these machines before June 20 arbitrary assessments of the full cost prices of the cars will be made against the owners.

Obnoxious Bill Killed—Wisconsin motorists take much satisfaction in the action of the state assembly killing the senate bill, by Kleszka of Milwaukee, making motorists almost wholly liable in case of personal damage cases, regardless of the negligence of the person injured or killed. Had the bill become a law, it would doubtless have forced insurance companies to deny liability indemnity to any motorist in this state.

Route Book Completed—The Automobile Club of Maryland has completed its year and route book and copies have been forwarded to the members of the club. Besides including a list of routes all over the country, the book contains many tours of the eastern section of the United States which might be taken with ease by the average motorist. Other features included in the publication are the motor laws of all the states, officers of the local club, as well as a full list of the members.

Want a Coast Glidden—A tour that will be for the Pacific coast what the Glidden tour is to the motorists of the east has been planned by a number of enthusiasts of the leading western cities. The route selected is from the Mexican to Canadian borders, via San Diego, Los Angeles, San Francisco, Sacramento, Portland and Seattle. This will make a trip 1,600 miles in length and will give a greater variety of roads and scenery than can be had over the same distance in any part of the world.

Road Directors Appointed—The Hood River Automobile Association has elected the following directors for the respective five districts into which the association has divided the county: District No. 1, Cascade Locks, A. O. Adams; district No. 2, Upper Hood River Valley, J. R. Putnam; district No. 3, East Side, Charles Hall; district No. 4, West Side, W. T. Sledson; district No. 5, the City of Hood River, Leslie Butler. Leslie Butler, president; J. R. Putnam, vice-president; Charles Hall, treasurer, and W. T. Sledson, secretary, were the officers elected. The new association will have for its aims

not only the promotion of the Columbia river motor road, but will use its efforts toward securing better roads for all parts of the Hood river country. It is the intention of the Hood River Automobile Association to further as much as possible the improvements of all the roads in that section.

New Bucyrus Law—An ordinance has been adopted by the city council of Bucyrus, O., fixing the limits in the city where the speed of cars can not exceed 8 miles per hour according to the Ohio state law. While municipalities in Ohio have no authority to enact speed ordinances for motor cars, still they have power to designate what portions are devoted to business for the better enforcement of the state law.

Placing Goodrich Markers—The Goodrich road-marking work was started in April of last year. Briefly, what has been done to date is this: The B. F. Goodrich Co. has placed a sign post every 3 miles along the main highway routes from Cleveland to Buffalo, then to Albany and New York city; over to Philadelphia and Atlantic City, and back to New York by way of Lakewood. While this work is progressing, another van and its crew have begun to mark the other side of the continent. Starting from the Mexican border and going north, the territory to be covered embraces all of the principal touring routes in southern California on the way to San Diego. The state of Washington is traversed to Seattle, through Olympia and Tacoma. In addition, a number of other interesting tours have been planned for the states of Oregon and Washington. In brief this coast road-marking means, all told, about 1,500 road-markers to be put up within the next few months for the convenience of the tourist. The work for the central states cannot be very well described in a brief account. Only the main routes to connect leading centres can be outlined. For example, from Cleveland, Ohio, there is one circuit through Canton, Columbus and Dayton, Ohio; Indianapolis and Ft. Wayne, Ind.; Toledo, Ohio; back to Cleveland. From Indianapolis, the road-markers will connect French Lick Springs, Ind.; Louisville and Lexington, Ky.; and Cincinnati, Ohio. Also from Indianapolis there are two routes to Chicago—one by way of Lafayette and the other through Ft. Wayne and South Bend. Toledo and Chicago are joined directly; so also Toledo with the large southern Michigan centres—Detroit, Jackson, Port Huron, Lansing, Grand Rapids and Kalamazoo. From Chicago there are routes to Milwaukee and Madison, and from the latter to the Twin Cities, Minneapolis and St. Paul. Chicago is joined to Dubuque and Davenport, Iowa, by Goodrich road-markers. At Davenport starts the river-to-river-road across the

state of Iowa through Des Moines to Omaha. In Minnesota the favorite tours within a radius of 75 miles of the Twin Cities will be marked by the Goodrich Co. This part of the work will be in progress at the same time that the New England and western routes are being completed. There will be a motor van in each section.

Minneapolis Will Have Parade—A parade will be a feature of the civic celebration which is to be held in Minneapolis July 2-8. The motor procession, the largest of the kind that has ever been held in Minneapolis, promises to have at least 2,000 cars in line. The parade will start promptly at 7 o'clock, so that the public will be able to view the decorated cars by daylight.

Milwaukee Orders Oil—The city of Milwaukee has contracted with the Indian Refining Co. for 300,000 gallons of asphaltum oil, at .0305 per gallon. The city purchased 100,000 gallons in 1910, and the results obtained from street-oiling were so satisfactory that three or four times as much roadway will be covered during the present season. Work will begin June 25 and be carried on to completion without delay.

Truck Dealers Will Organize—A movement is under way to effect a permanent organization of the commercial vehicle dealers in Philadelphia and unite with the Philadelphia Automobile Trade Association, an organization of dealers in pleasure cars with headquarters at the southwest corner of Broad and Callowhill streets. A meeting to select permanent officers will be held this week. About thirty branch managers and agents were represented at a meeting held last week to launch the movement.

Blow at Street Cars—East Baltimore merchants have passed resolutions favoring the establishment of a motor car passenger line in their section of the city. This action followed the refusal of the United Railways Co. to run the Sparrows Point cars up Eastern avenue, Baltimore, Md. The plan is to have the line run from a point in East Baltimore, near Patterson park, to Broadway, up Broadway to North avenue, and out North avenue. This would give passengers from Sparrows Point proper facilities along this route.

Kenton Planning Outing—At a recent meeting of the Kenton Automobile Club, of Kenton, O., arrangements were made to hold an outing some time in July, the date to suit the convenience of Dr. C. L. Bonifield, president of the Ohio State Automobile Association. The outing will partake of the nature of a good roads meeting to a certain extent. The club adopted resolutions to prosecute small boys who have been throwing stones and other articles at passing automobiles. Several motorists have been injured recently by being struck by articles of various kinds. A committee was appointed to draft an ordinance for the regulation of traffic within the limits of Kenton.

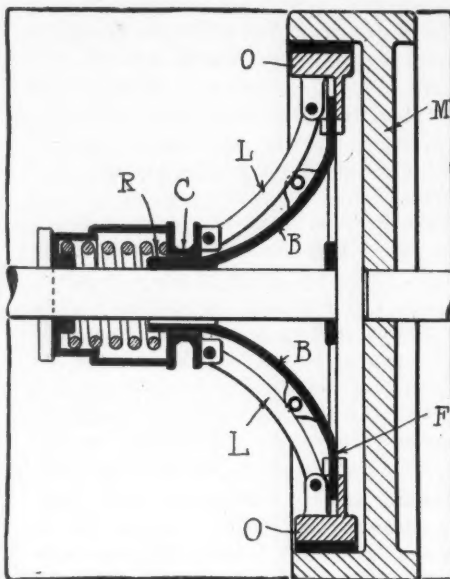
Current Motor Car Patents

BASFORD Changeable-Drive Mechanism.

—No. 994,367, dated June 6; to Claude R. Basford, San Francisco, Cal.—As shown in an accompanying illustration, this patent covers a speed-changing mechanism for motor cars, the combination of a shaft, a changeable-speed disk loose on the shaft, a differential gear casing mounted on the shaft and connected to the changeable-speed disk, a drive shaft extending transversely of the first mentioned shaft, separated pinions loosely mounted on the drive shaft, the changeable-speed disk having a plurality of toothed rings, one for each of the pinions, slidable crown clutches for locking the loose pinions to the drive shaft, and a link connection between the crown clutches extending through the pinions.

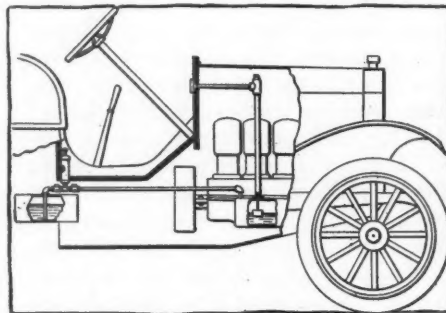
Lyhne Tire Pressure Gauge—No. 994,701, dated June 6; to Anker S. Lyhne, Bridgeport, Conn.—The pressure gauge to which this patent relates is adaptable for use in testing the pressure of air in motor car tires. As illustrated, it comprises a slotted case having a scale, a sliding sleeve upon the case, spring arms upon the sleeve for frictionally engaging the casing, and a pressure-actuated plug within the case which engages the sleeve.

Differential Two-Cycle Piston—No. 989,391; dated April 11; to F. J. Moser, Kane, Pa.—The two-cycle motor has a double-diameter cylinder, the top or small-diameter part being a power cylinder and the lower or large-diameter part constituting a pump for forcing the mixture into the power cylinder. The claims include: A power piston for the power cylinder, a pump piston for the pump cylinder and means for supplying a compressed gas from said pump cylinder to said power cylinder, said means including a storing chamber



FAILLE SHOE CLUTCH

and a secondary explosion port in said power cylinder, located adjacent the up-



HANS OIL INDICATOR

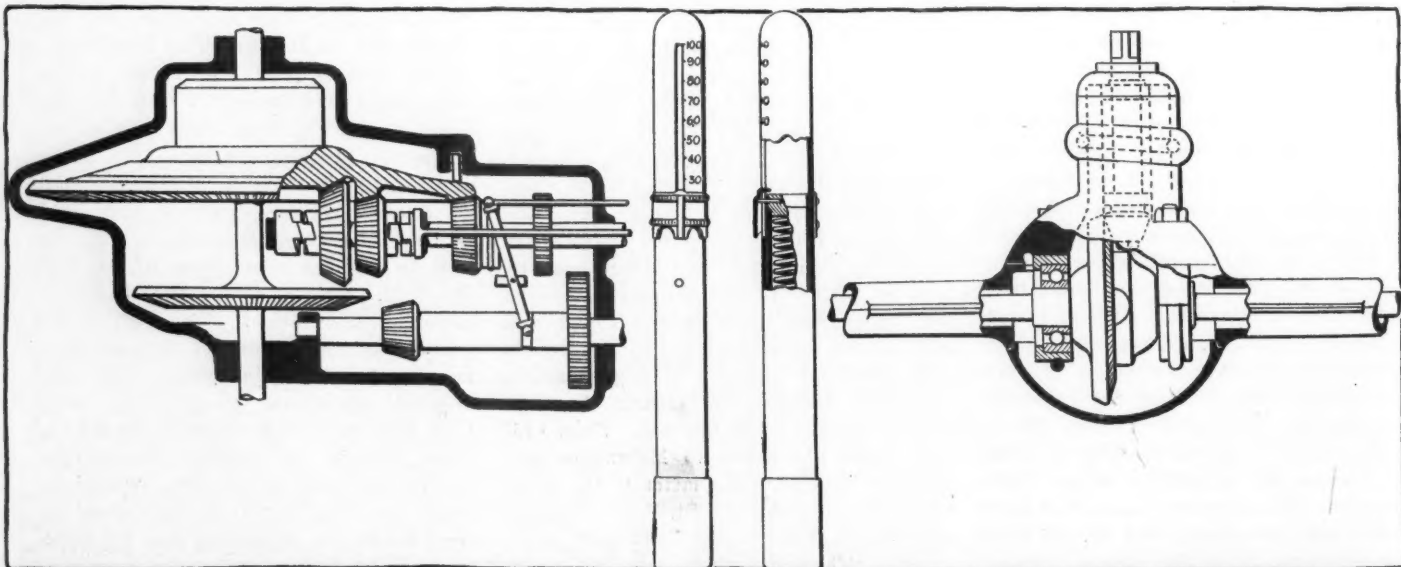
permost travel of said power piston and above said exhaust port, said secondary explosion part being of sufficient magnitude to store an explosive charge which

is adapted to exert a secondary impulse on said power piston when said explosion port is uncovered.

Hans Oil-Supply Indicator—No. 994,389, dated June 6; to Edmund E. Hans, Minneapolis, Minn.—This patent pertains to an attachment to the oiling system of a motor car. As shown in an accompanying illustration, it is a combination with a motor-driven vehicle having a crankcase adapted to contain a quantity of oil and a well communicating with the crankcase, a float arranged in the well, an indicator-hand and dial mounted on the dashboard and means operatively connecting the indicator hand with the float.

Frost Adjustable Bearings—No. 994,452, dated June 6; to Edward J. Frost, Jackson, Mich.—As illustrated, this patent relates to a means whereby the bearings of a bevel gear rear-axle can be adjusted. It is a combination with a rigid frame, of a plurality of projections formed thereon having aligned semi-cylindrical bores, rings mounted in the bores and provided with helical grooves, U-shaped yokes extending around the rings in the grooves and having their ends projecting through holes in the frame, nuts on the ends of the yokes, and bearings mounted in the rings.

Faille Expanding Shoe Clutch—No. 994,379, dated June 6, to George E. Faille, New York, N. Y.—This patent clutch comprises a driving member M having an inner bearing surface, and a driven member having a substantially conical body member B presenting an outer annular flange F at the larger end, and a collar R. A collar C is axially guided upon the flange F, and shoes O are guided radially upon the flange F, and links L are provided which operatively connect the shoes to the collar C.



BASFORD CHANGEABLE-DRIVE MECHANISM

LYHNE TIRE GAUGE

FROST ADJUSTABLE AXLE BEARINGS

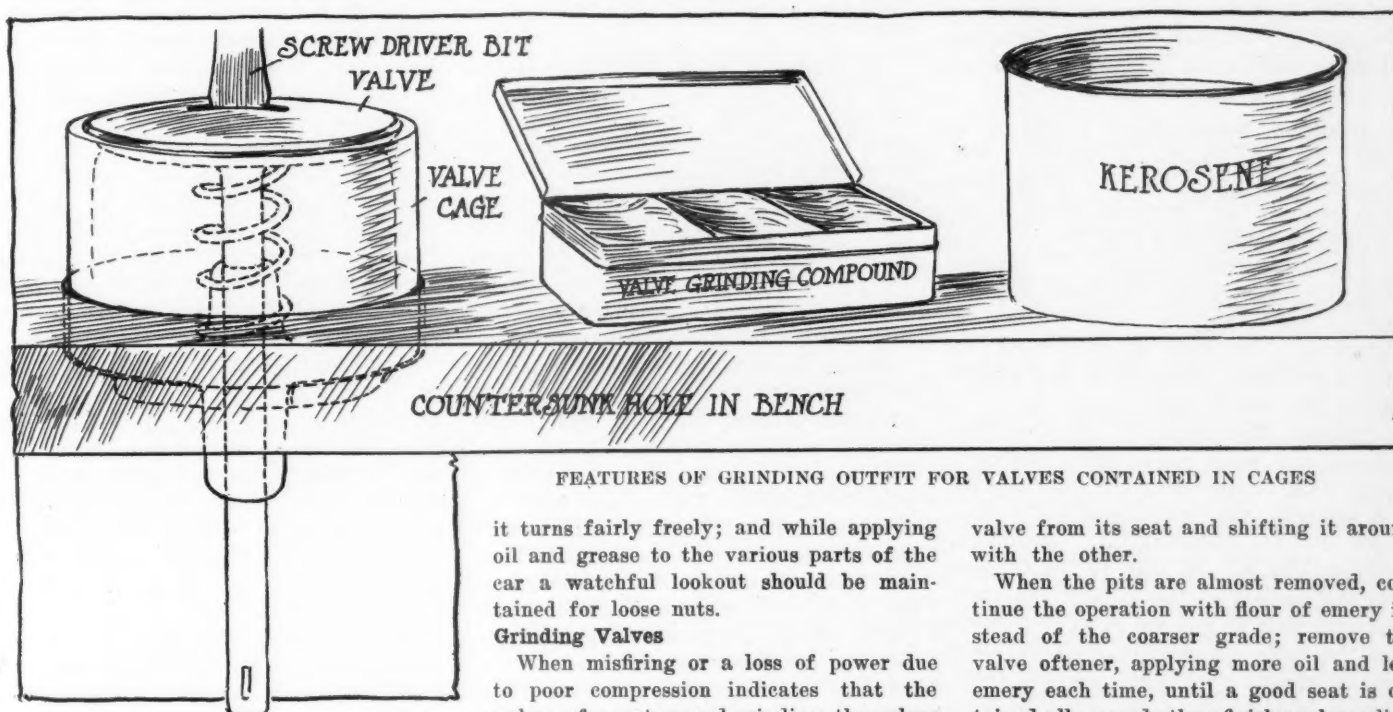
The Motor Car Repair Shop

AT this season of the year many new cars are being delivered into the hands of both experienced and inexperienced motorists and a few suggestions regarding the lubrication of the various component parts of the car should be appreciated. When the car is received from the dealer or factory, the first thing that the owner or driver should do is to drain all the oil from the crankcase of the motor, flush it out with kerosene, then fill to the required amount with the best grade of gasoline engine oil. Next, if conveniently possible, pour a cupful, or squirt a gunful of oil into the timing-gear case. Then take up a hand oil can and carefully go over the entire motor and other features of the car. Apply a few drops of oil to

Hints for the Amateur

to the starting crank of the motor. So much for the oiling; and now for the application of the grease. The car should now be gone over again in the same systematic manner and all grease cups refilled. Grease cups generally are to be found on the fan-bracket of the motor, the water-pump shafts, the steering-gear case, and often on other features located under the hood. Grease cups also often are to be found inside the spokes of a cone clutch, on the clutch operating mechanisms, the rear axle, the spring-shackles and the front axle steering spindles. It is a good precaution to jack up each wheel and see that

with rather a coarse grade of emery. Apply a coat of cylinder oil to the face or seat of the valve, distributing it with the tip of the finger; then dip the oily finger into the emery and apply that which adheres to it to the seat on the valve. Be careful to keep the stem of the valve clean, so the guide will not be enlarged. If a screwdriver or plain valve-grinding tool is to be used, the operator should hold the valve-grinding tool in one hand, take hold of the valve stem with the other, assume as comfortable a position as possible, and begin the grinding operation. This consists in turning the valve about a half revolution back and forth on its seat in the cylinder or cage by means of the tool in one hand, and occasionally lifting the



FEATURES OF GRINDING OUTFIT FOR VALVES CONTAINED IN CAGES

it turns fairly freely; and while applying oil and grease to the various parts of the car a watchful lookout should be maintained for loose nuts.

Grinding Valves

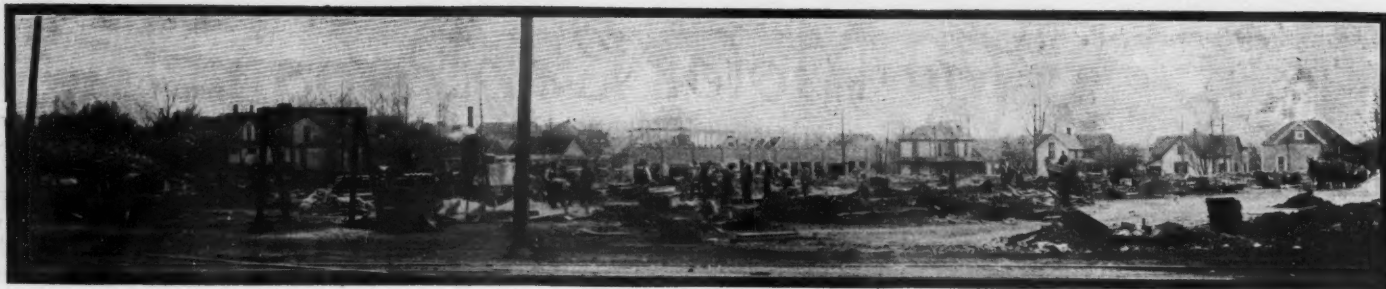
When misfiring or a loss of power due to poor compression indicates that the valves of a motor need grinding, the valves should be removed one at a time and ground in as follows: Should the motor be an L or a T-type, remove a valve and plug the opening between the cylinder and valve-chamber with a bundle of cloth, having previously tied a string to the cloth which is attached to some external portion of the motor, or raised the piston to the top of the cylinder, so that the cloth will not fall into the cylinder. This is to block up the entrance to the cylinder and prevent emery from getting in and scoring the walls of the cylinder and piston. If the motor is a valve-in-the-head type, with the valves contained in removable cages, these precautions will not apply. If emery and oil is to be used in preference to the specially prepared valve-grinding compounds on the market, to grind in a valve which is badly pitted it is well to begin

valve from its seat and shifting it around with the other.

When the pits are almost removed, continue the operation with flour of emery instead of the coarser grade; remove the valve oftener, applying more oil and less emery each time, until a good seat is obtained all around; then finish up by polishing the seats with oil. Kerosene is most effectively used in finishing the seats of a valve, and the smoother the finish obtained the less chance for a carbon deposit.

In the illustration shown herewith is to be seen the valve grinding outfit used in a factory where valve-in-the-head motors are made. At the right is shown a can of kerosene into which the valve-and-cage-unit is dipped at frequent intervals; in the center is a box of specially prepared valve-grinding compound containing coarse, medium and fine grades; and at the left is shown the valve and valve-cage resting in a counter-sunk hole in the bench with a spring under the valve to raise it. This means of supporting the valve cage permits of the use of a brace and bit or breast drill to facilitate and make easier the valve-grinding operation.

the push rods, carbureter and ignition control-rod connections, and to the magneto and to all parts where relative movement takes place. Having thoroughly oiled the motor, lift the floor boards and apply oil to all clutch-control and brake operation mechanisms; trace every moving rod, shaft or pin to its bearing and not only apply oil to it but move the parts until the oil is worked into the bearing surfaces, and smooth and easy operation of the parts is obtained. After this get under the car and make sure that all equalizers and brake-rod connections and universal joints are properly lubricated. The external features of the running gear are next in order, and a few drops of oil should be applied to all spring bolts and shackles, brake-rods and levers arranged outside of the frame, steering-gear connections, and



THE HAYNES PLANT AT KOKOMO AFTER THE FIRE FEBRUARY 28

ALTREE a Fal Director—A. H. D. Altree, of the Bosch Magneto Co., has been named as a director of the Fal Motor Co. of Chicago. Joseph Borovitz has been made factory manager and chief engineer.

Making Truck Bodies—George Van Antwerp, of Grand Haven, and John W. Landman, of Grand Rapids, Mich., are organizing a company to manufacture a device of Mr. Antwerp's invention by which bodies of commercial motor trucks may be loaded independently of the truck itself. The company has secured a site for the building of a factory, which will be erected in the near future.

Change of Name—The C. F. Megow Co., 163 Barclay street, Milwaukee, Wis., manufacturing the Champion motor truck, has changed its corporate name to the Milwaukee Auto Truck Mfg. Co.

Enameling Plant Resumes—The enameling department of the Mitchell-Lewis Motor Co. at Racine, Wis., is again ready for business. The building containing the ovens was badly damaged by an explosion about two months ago.

Haynes' New Plant—A series of illustrations on these pages shows the rapid work done in rebuilding the Haynes plant at Kokomo, Ind., which was badly damaged by fire February 28. Rebuilding started May 3. On May 10 the columns for the support of the balcony and main building were up and the paint shop ready for the roof. On May 16 the paint shop was completed and work on the forge shop, a building 50 by 150 feet with floor space of 15,000 square feet, had started. June 1 the brick work was well under way; June 7 sheeting was being laid on the roof, and on June 10 the plant practically was complete. It is expected it will be ready for operation by July 10. The new Haynes plant consists of six fireproof buildings constructed entirely of steel, concrete and brick. The main factory building, 200 by 300 feet, one story, with balcony arrangements, has a floor space of over 100,000 square feet. In this building the chassis of the Haynes car will be built complete. The paint shop, 93 by 125 feet, two stories, has floor space of 22,250 square feet; the forge shop is 50 by 150 feet, with floor space of 15,000 square feet, and the power house is 75 by 75 feet. It is to be equipped with a battery of boilers and a 500-kilowatt generator, which will light, heat and generate

Among the Makers

power for the entire plant. The trim shops are installed in a building 50 by 130 feet, with a floor space of 12,000 square feet. All bodies are upholstered in this building and tops and side curtains are made complete. At the present time 200 men are at work on the new plant. The total cost of buildings alone will be \$75,000.

Twenty-Story Office Building—Ground has been broken and building operations are under way for the new twenty-story office building which, when completed, will be occupied by the United States Tire Co. The site is located at Broadway and Fifty-eighth street, New York. Most of the floor space will be used by the United States Tire Co. and the United States Rubber Co. It is expected that the new building will be ready for occupancy by January 1.

Boston Re-elects Old Officers—The Boston Automobile Dealers' Association held its annual meeting last week and so well satisfied were the members with the present officers that they were all honored with re-election. There has been no change in the principal officers for several years. The matter of next year's show was briefly discussed, and while no action was taken upon it the understanding was that it will be held at the same time as in the past, which will be next March at Mechanic's building. The fact that there is to be a separate show for commercial

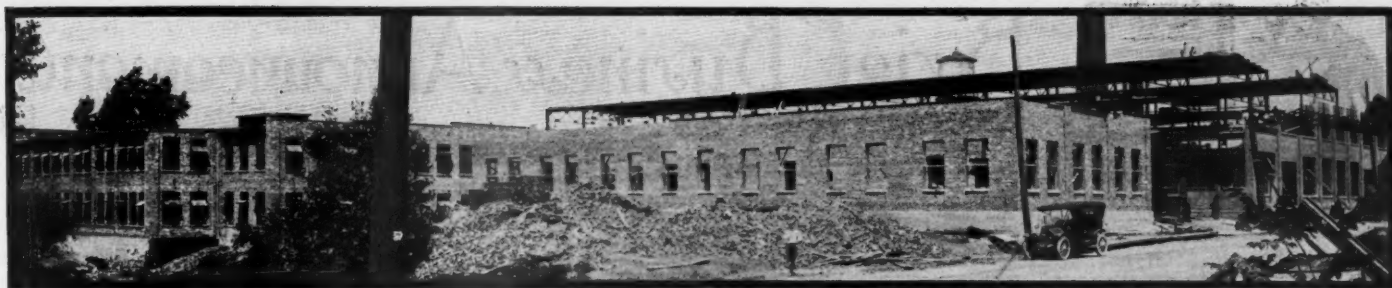
vehicles will allow greater space for the pleasure car dealers, and they will be notified to that effect so that they may get in their applications early. Practically all the dealers in the Hub have already applied for space for next year, and there is no question about getting rid of all of it.

Moving to Saginaw—Announcement has been made that articles of incorporation for the Duryea Automobile Co., naming a capitalization of \$300,000, have been filed with the secretary of state of Michigan and that arrangements for removing the machinery and apparatus for the plant to Saginaw, Mich., will be started immediately. The stock allotted to Saginaw for the company is all subscribed and ran several thousand dollars over the amount allotted to the city.

Brick Kuhn Dead—Brick Pomeroy Kuhn, identified with the industry since its inception, died at his home in Twin Falls, Ida., June 14, of pneumonia. He was confined to his bed about 2 weeks. He leaves a wife, and a brother and sister in Council Bluffs. The remains will be taken to the old home at Council Bluffs. Mr. Kuhn in 1903 was connected with the advertising department of Motor Age. Later he became sales manager of the Jewell Motor Car Co., going in 1906 to Omaha, where he engaged in the sale of commercial vehicles. In the fall of 1910



NEW HAYNES PAINT SHOP COMPLETE EXCEPT WINDOWS 7 DAYS AFTER FIRE



NEW HAYNES PLANT AS IT LOOKS TODAY
—ALMOST READY FOR OCCUPANCY

and Dealers

he removed to Twin Falls, and since that time has been in the real estate business. He also was the secretary of the Twin Falls County Automobile Club.

Joins Stromberg Staff—Ward G. Leathers, formerly manager of the advertising service department of Motor Age, has been appointed advertising manager of the Stromberg Motor Devices Co., of Chicago.

Downs With Autocar—Merle L. Downs, who for a number of years has been secretary of the show committee of the A. L. A. M. shows in Madison Square garden, New York, has associated himself with the Autocar Co., of Ardmore, Pa.

Atlanta Dealers Organize—For the first time since the days of Atlanta's one and only motor show the car and accessory dealers are organized. In two sessions the Atlanta Automobile and Accessory Dealers' Association, of Atlanta, Ga., was launched. This body has large plans, among them the possible leasing of the speedway and the holding of a dealers' show. The officers elected were George W. Hanson, president; F. J. Long, vice-president; C. L. Elyea, second vice-president; W. E. Gordon, secretary and treasurer. The directors named were F. J. Long, Lindsay Hopkins, M. C. Huie, H. A. Price, W. D. Alexander, J. W. Goldsmith, Jr., W. G. Hollis and F. C. Steinhauer.

The constitution as adopted was along conventional lines. It excluded curbstone dealers from membership, but departed from the ordinary in including motor cycle dealers among the membership eligibles. A committee was appointed to look after the legislative needs of the body and to employ attorneys to draw up a bill to take the place of the present motor law.

Another Republic Building—The Republic Rubber Co., of Youngstown, O., is erecting a building which will be used exclusively by the mechanical department—for machine shop, pattern works, etc.—and will be of fireproof construction, 70 by 130 feet, equal to two stories. The inside will be one large working room, with balcony around three sides for the storing of stock. The large five-story addition to the staggard tread tire department has been completed.

Enlarging Ohio Electric Plant—The Ohio Electric Car Co., of Toledo, O., has bought 9½ acres of ground on Bancroft street, at the head of Auburn avenue, west of the Lake Shore and Michigan Southern Railway. There is a 400-foot frontage on Bancroft street and the lot is 1,400 feet in depth. The factory will be 240 feet long, 60 feet wide and three stories in height. There will be two wings, each 40 by 60 feet. The building will be of standard mill construction, with iron girders and fenestra sash. It will be

equipped with a standard automatic sprinkler system. The floor space will be about 50,000 square feet.

Buick Behind in Orders—A meeting of the branch managers of the Buick Motor Co. will be held in Flint, Mich., in the near future for the purpose of arranging some means of supplying the branch managers with a limited number of cars, the company being unable to deliver the full number desired because of unfilled orders. At the present time, the company claims to have orders for five times as many 1911 cars as can be manufactured. The company now is manufacturing about 100 cars daily.

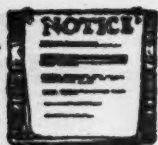
Would Resign as Trustee—W. C. Durant has petitioned the circuit court at Flint, Mich., to accept his resignation as trustee of the Buick Motor Co., in the payment of a monthly income of \$50 to George W. Shotwell, of Santiago. Mr. Durant asks for the appointment of another trustee. It is represented in the application that, while treasurer and general manager of the Buick Motor Co., Mr. Durant received eighty-six shares of preferred stock in the General Motors Co. with which to pay the monthly income to Shotwell.

Trade Picnics—The first of the big picnics of the summer at Akron, O., was held June 10, when the Goodyear company sent 5,000 to Myers lake at Canton for a day's outing. The annual picnic by the thousands of employees of the Goodrich company will be held August 5 at Silver lake. Both trolley and steam roads will carry crowds. The Diamond Rubber Co. will hold its annual outing this year at Silver lake on July 29. The Firestone company people will go to Cedar Point July 24 for their outing, taking the boat at Cleveland.

Cartercar After More Room—It has been announced by officials of the Cartercar company that a new machine shop will be erected immediately at Pontiac, Mich. The building will be of brick, one story, with dimensions 144 by 70 feet, and will provide approximately 10,000 square feet of floor space. Work will be commenced upon the building this week. The company now has a force of 350 men on its payroll and sufficient orders ahead to run to full capacity until the close of the year. As soon as the new shop is up, it is the intention of the officials to put on a night force.



NEW HAYNES PAINT SHOP AS IT LOOKED ON MAY 16



Brief Business Announcements



CLEVELAND, O.—Harry S. Moore has accepted the agency for the Locomobile.

Kenton, O.—R. E. Harris, of South Detroit street, has taken the agency for the Cole.

Dayton, O.—The Apple Electric Co. will shortly begin the erection of a one-story brick building to permit an extension of business.

Columbus, O.—H. L. Bogardus has taken a position as salesman with the United Motor-Columbus Co. to sell Maxwells and Columbias.

Pittsburg, Pa.—The Selden Automobile Co. is about to dissolve partnership and will close its establishment at 320 Liberty avenue, where it has been located for some time.

Detroit, Mich.—A new firm of dealers has made its debut at Woodward avenue and the boulevard. The Smith-Galvin Auto Co. is its firm name. It will shortly announce its line.

Cleveland, O.—W. A. Harshaw will open the Motor Supply Co. at East Sixty-fifth street and Euclid avenue. Harshaw has acted as Cleveland manager for the Firestone Tire and Rubber Co.

Baltimore, Md.—The Winton Motor Carriage Co. of Baltimore announces that it will occupy its new building the latter part of the present month. This structure is located at Mount Royal and North avenues.

New York.—R. M. Owen & Co. have secured G. F. Aitken for their Reo and Premier local retail selling organization, at 1759 Broadway. Mr. Aitken formerly was with the local branch of the E. R. Thomas company.

Superior, Wis.—The Ross Motor Co. is extensively remodeling its garage and salesrooms, at a cost of \$20,000. The building will be considerably enlarged, and when work is completed will have dimensions of 130 by 50 feet and two stories high.

Milwaukee, Wis.—The W. R. Sherin Co., 137-143 Eighth street, Milwaukee, repairing, overhauling and painting, soon will occupy its own home. Construction work was started this week on a new building for the company on River street, to be 150 by 150 feet in size.

Akron, O.—Fred C. Wood and Andrew Auble, who have been together both in Akron and Cleveland, have dissolved partnership. There has been a dissolution of the partnership known as the Olds-Oakland Auto Co., of Akron and the Olds-Oakland Co. of Cleveland. Mr. Wood has purchased the interests of Mr. Auble in the Cleveland business and Mr. Auble the interests of Mr. Wood in the Akron busi-

ness. The Olds-Oakland Auto Co. of Cleveland is being reorganized.

Reynoldsville, Pa.—Warren W. Deible will at once build a large garage on Fourth street.

Columbus, O.—The Columbus Auto Inn Co., at High street and Sixth avenue, has taken the central Ohio agency for the Zimmerman.

Portland, Ore.—E. C. Dolen, in addition to acting as Portland agent for the Herreshoff, has secured the agency for the Pratt-Elkhart car.

Des Moines, Ia.—The Moyer Auto Co. has taken the Iowa agency for the Krit car, manufactured at Detroit. The Krit car formerly was sold here by the Manufacturers' Selling Agency.

Dayton, O.—Ben J. Ooley, formerly head of the Ooley Automobile Co. of Dayton, has gone to Atlanta, Ga., where he will have charge of the distribution of cars manufactured by the United States Motor Co.

Cleveland, O.—The Ford Motor Co. held an Ohio branch picnic Saturday, June 17 at Canton, O. More than 200 Ford dealers were present. A parade was held in the forenoon and races participated in only by Ford cars in the afternoon. A banquet was given in the evening.

Warren, O.—The Ohio Universal Truck Co. has been organized at Warren by W. C. Pendleton, O. R. Grimmesey, P. A. Balcolm, W. R. Hostetter and George E. Werner. Temporary offices have been opened on the third floor of the Western Reserve National Bank building.

Detroit, Mich.—P. E. Dean, who has been representing the Ames-Dean Carriage Co., of Jackson, Mich., and traveling throughout Ohio and Michigan, has become associated with the Abbott Motor Co. as a part of its general sales force. He will travel the state of Michigan.

Cleveland, O.—L. W. Kellogg, formerly with the Halle Brothers as chief engineer, has accepted the agency for the Detroit electric commercial vehicles. Manager Secrest will continue to sell the Detroit electric pleasure vehicles. The service department for the new agency will be located at Euclid avenue and East One Hundred and Fifth street.

Boston, Mass.—Smalley Daniels, manufacturers' representative, 23 Motor Mart, Boston, Mass., has lately taken over the marketing of factory product of the Boreas windshield, manufactured by the Page Woven Wire Fence Co., Adrian, Mich., and Forse speedometers, manufactured by the Forse Mfg. Co., of Anderson, Ind. Mr. Daniels also has opened offices in the Chalmers building, 1469 Michigan avenue, Chicago, Ill., and in Motor Hall,

250 West Fifty-fourth street, New York city.

Oshkosh, Wis.—The F. S. Hoaglin Auto Co. of Oshkosh has moved into its new garage.

Cleveland, O.—Harry Lance, who has had charge of the Thomas business in Cleveland, has accepted a position with D. W. Iseminger, of the Velie branch.

Chicago.—The Federal Motor Car Co. has added the Herreshoff to its line, with the sales rights in the states of Illinois, Wisconsin, northwestern Indiana and southwestern Michigan.

New York.—The Carhartt Automobile Co. announces that William H. Gage has resigned his position as general sales manager and that John V. Schenk has been appointed in his place.

Madison, Wis.—John Horstmeier has been appointed agent for the Johnson car. He has organized the Horstmeier Brothers Co. and will have headquarters at 1420 Williamson street. A downtown garage will be established later.

Pittsburg, Pa.—D. T. Riffle has been awarded the contract for the \$50,000 garage of the McCurdy-May Motor Co., to be erected at Center and Negley avenues, east end. The building is to be 60 by 150 feet and two stories high.

Cleveland, O.—R. J. Schlosser, of Warren, Pa., has taken a long lease on property on Euclid avenue, just east of East Eighty-ninth street, and has started to erect one of the largest and most modern garages and salesrooms in Cleveland. He will have the agency for the Everitt Co.

Portland, Ore.—The John Deere Plow Co., Portland agent for the Velie, recently moved into its new home on East Second street. The freight-handling facilities of the big building are unique, as the vehicles are taken direct into the building to any of the three floors without the necessity of going on the street.

Chicago.—The Thomas B. Jeffery Co. of Illinois, distributor of the Rambler, has moved from the heart of the row on lower Michigan avenue to one of the finest salesrooms in the city, just one block and a half south of the Blackstone hotel. The new Rambler sales headquarters are at 1008 Michigan avenue, while the Rambler service department will be located, for the time being, at the former sales and service building, 1462-64 Michigan avenue. The first floor of the new building has been remodeled throughout, 10,257 feet of floor space being provided for the display of cars. A system of lighting has been installed so that the cars may be displayed at equal advantage in all parts of the room. On the top of the building is the largest single-word display electric sign

in Chicago. The word "Rambler," 48 feet long, appears in red electric bulbs, each letter of the word being 20 feet high.

Detroit, Mich.—R. J. Buel, formerly advertising manager of the Regal, is now with the Overland at Toledo as assistant advertising manager.

Baltimore, Md.—The Waverly electric now is being handled by the Mount Vernon Motor Car Co., representative also for the Regal and Autocar.

Akron, O.—The Manufacturers' Rubber and Supply Co., of Akron, has been incorporated with a capital of \$10,000 by R. F. Dalt and others, to manufacture and sell rubber articles.

Pontiac, Mich.—The Ford Sales Co. is the latest concern formed in this city for the handling of motor cars. Frank S. Milward, for a number of years connected with the Welch Motor Car Co., is manager of the new firm.

Dayton, O.—The Dayton Automobile Co., of 115-117 West Fourth street, has been reorganized with J. E. Studebaker as president; Dr. J. E. Beck, vice-president; Dr. I. N. Agenbroad, treasurer, and A. S. Idings, secretary. The company will continue to operate the garage and repair department at that address.

Tacoma, Wash.—Rushmore & Little, Tacoma distributors for the Winton and Cadillac cars, have dissolved partnership, G. D. Rushmore selling his interest in the St. Helen's garage to T. W. Little. Mr. Rushmore intends moving to Portland and will handle one of the well-known makes of trucks in that city and vicinity.

Spokane, Wash.—W. H. Barnes & Son, Spokane representatives of the Rapid Motor Vehicle Co., have found it necessary to secure larger quarters owing to the increased volume of business this year. The first floor of the new building is devoted entirely to the sales and display room and the second story is used for a paint shop.

Recent Incorporations

New York—Kays Exhibition Aviators Co., capital stock \$50,000; incorporators, E. B. White, H. A. Conners, F. S. Caslen and W. Wilson.

New York—Black Hawk Motor Co., capital stock \$50,000; to manufacture motorcycles and motors; incorporators, R. W. Gould, H. S. Dickinson and A. W. Mitchell.

Wilmington, Del.—D. P. Hart Co., capital stock \$10,000; to deal in motor cars and to manufacture and sell parts; incorporators, D. P. Hart, Myrtle M. Hart and W. Austin Watson.

Chicago—Dann, Dodge & Co., capital stock \$5,000; to manufacture and deal in motor cars, accessories, etc.; incorporators, E. G. Dann, Henry H. Dodge and Donald D. Dodge.

Chicago—Ashland Taxicab Co., capital stock \$1,000; to manufacture and deal in motor cars, motors, etc.; incorporators, Lewis X. Carver, Charles W. Daly and Benjamin E. Cohen.

New York—S. D. Mfg. Co., capital stock \$30,000; to manufacture motor cars, motorcycles and accessories; incorporators, J. R. Spangler, H. B. Spangler and Otto C. De Wald.

Albany, N. Y.—Suspension Tire Co., capital \$500,000; incorporators, R. G. Grigg, C. A. Walter and D. C. Pennypacker.

New York—Motor Tour Co., capital stock \$100,000; to deal in motor cars, etc.; incorporators, H. D. Kerr, B. M. Day and E. E. Day.

In the basement is a larger space arranged for a garage with every appliance necessary to render quick service to truck users.

Burlington, Wis.—James N. Thomas has opened a garage at Burlington. He formerly was associated with the Guarantee Auto Co. of Burlington.

Columbus, O.—P. P. Kinney, formerly a salesman with the Studebaker branch at Columbus, has taken a position as salesman with the John M. Howard Co., central Ohio agent for the Buick and Welch.

Freeport, Pa.—The Meyer Motor Co., capital \$200,000, has been organized by E. A. Meyer, an inventor, who has patented an engine which is constructed of three moving parts. Most of the capital stock already has been paid in by business men in Kittanning and other towns of Armstrong county, Pennsylvania. The

company has secured a site at Freeport, on the Allegheny river, and will build a plant at once to employ fifty men.

Baltimore, Md.—The Kline hereafter will be handled in Baltimore by Neely & Ensor, the present agents for the Alco.

Boston, Mass.—The C. H. Proctor Supply Co. has moved into its new building at 1008 Commonwealth avenue. It is a one-story structure of reinforced concrete.

Vancouver, Wash.—Rice & Ringrose, formerly of Vancouver, have recently erected in McMinnville, Ore., a new brick and cement garage for the storage of cars.

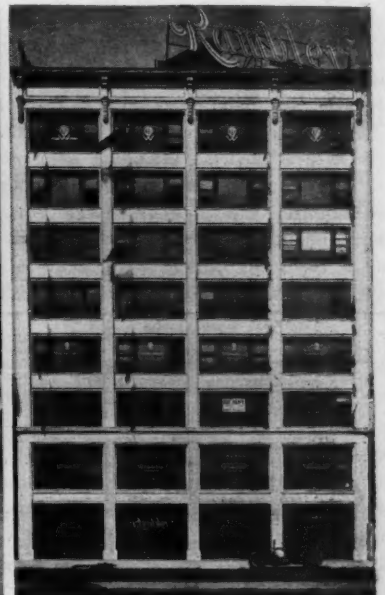
Des Moines, Ia.—The Ryan Motor Co., Iowa agent for the Chalmers, has closed a contract which will give that concern the Des Moines agency for Rauch & Lang electrics. The Ryan company also has the local Pierce-Arrow agency.

Detroit, Mich.—The Metzger Motor Car Co. has added to its sales staff H. D. W. Mackaye and E. E. Cole. The former will be assistant to Sales Manager Hood. Mr. Cole will travel as a technical expert, visiting the company's dealers.

Minneapolis, Minn.—A. N. Smith, of Minneapolis, for the past 3 years sales manager for the Royal Auto Co. in Minneapolis, has become associated with the general sales force of the Abbott Motor Co., with headquarters in Minneapolis.

Pittsburg, Pa.—The Craig Center Automobile Co., Incorporated, has been formed by R. P. Sullivan, who is president, and G. C. Mars, formerly of the L. G. Martin Co., who is secretary-treasurer. The company will do a general garage business.

Pontiac, Mich.—Articles of incorporation have been filed here by the Carter Dump Wagon and Mfg. Co., formerly of Holly. The object of the association is the manufacture of dump wagons, carriages, wagons, wagon bodies, trucks, wheels, axles, motor cars, engines, motors, motor parts and accessories.



NEW RETAIL STORE IN CHICAGO OF THE THOMAS B. JEFFERY CO.



Development Briefs



Penfield Shock Absorbers

AMONG the devices on the market for the purpose of assisting the regular springs of a car in taking up the road shocks is the Penfield shock absorber. In external appearance this supplementary spring is much like the other shock absorbers. Its chief feature is in the use of a triple circular coiled spring within the central portion, as indicated in the illustration. This spring is provided with an adjustable stop to permit of variations in its throw. The makers claim that the device is entirely free from wear on account of the arrangement of the springs. It is made by the Penfield Shock Absorber Mfg. Co., Meriden, Conn.

Palmer Truck Tires

It has often been noticed that the tires of motor vehicles do not wear evenly across the face. With the heavy trucks this effect is very evident and unless some special provisions are made, it is often necessary to discard a tire that would be good for a much longer life were it not for the excessive wear on a small portion of the face. An English solid truck tire which also is being brought out in slightly different form in this country is so arranged that a circumferential strip can be removed when worn and another strip substituted for it. The face of the tire is divided into four strips by steel rings which run around the rim, the portions being held in place by rods as shown in the illustration.

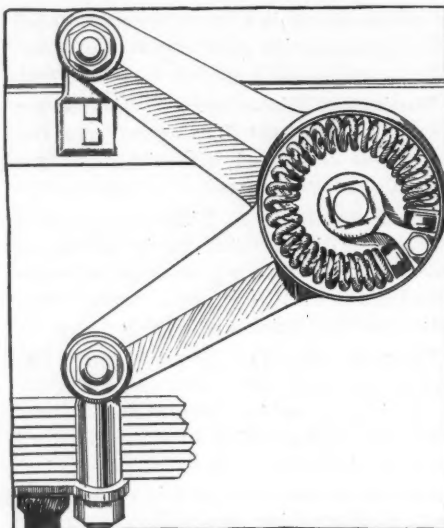
Carbo-Light Tank Generator

An acetylene generator that has the appearance of the storage tanks used for carrying the gas on a motor car is the Carbo-Light tank generator made by the Carbo-Light Co., Anderson, Ind. It is, as shown by the illustration, a steel tank made from high-grade steel, specially treated to resist rust. It is 6 inches in diameter and 22 inches in length. No rivets are used, as all parts are welded.

The generator is composed of two compartments, the smaller being for water and the larger for the carbide and to act as a reservoir for the gas that is generated. It will be noted that a small tube

connects the chambers, one end of the tube coming near the bottom of the water chamber and extending upward and through the partition into the generating chamber, ending in a Y-shaped gutter which distributes the water over the carbide. Gas passes back through this tube from the generating chamber through the water in the other and collects above the water until the pressure is equal in both chambers.

When gas is supplied to the lamps from the generating chamber, the resulting difference in pressure forces water through the tube from which it is arrayed upon the carbide. This causes the generation of more gas until the pressure in the two chambers is again equalized, when the water automatically stops flowing, and the generation of gas is discontinued. The

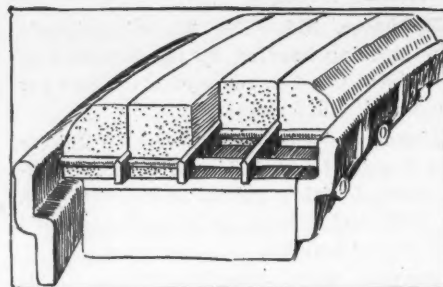


PENFIELD SHOCK ABSORBER

gas already in the tank remains until it is wanted, the tank thus acting as a combination generator and storage tank.

Noflux Aluminum Solder

The difficulty of soldering aluminum parts, such as crankcases and other motor-car parts made of this metal, has resulted in the appearance of a patented aluminum solder which is marketed under the name of Reinhold Noflux aluminum solder. It makes a very strong joint, in fact, the



PALMER TRUCK TIRE

makers claim that the soldered joint is stronger than the metal itself. The services of an expert are not required in using the preparation, as an ordinary soldering iron or blow torch is all that is necessary. A feature that makes for simplicity in the operation is that no flux is needed in making a joint.

Another Reinhold product is a combination solder to be used when aluminum is to be joined to other metals, such as copper, brass, etc., in fact, any metal except cast iron. The combination solder is merely employed as a tinning coat, the actual soldering being accomplished with the aluminum solder.

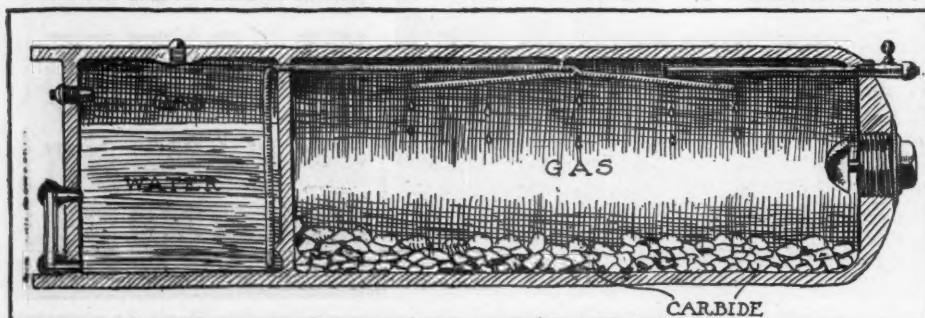
Finyoun Portable Garages

In connection with their line of portable houses, F. C. Finyoun & Son are putting out a line of garages designed to be easily set up or taken apart for transportation. The side walls are made in interchangeable sections about 4 feet wide from 1/8-inch white pine siding, tongued and grooved. For shipment these sections are put up in crates of a convenient size for handling. The height of each section is 8 feet. The lumber used is dressed on both sides, so that the interior has a smooth and finished appearance. Dressed roof panels take the place of ceilings. These portable garages come from Cleveland, O., and should prove particularly useful for motorists who wish a portable building for housing the car while on vacations.

Mills Economizer and Filter

With a view to producing better and quicker mixing of the gas and air with the usual types of carburetor, a British device, called the Mills petrol economizer and filter has been recently developed. The attachment can be applied to any carburetor and delivers a very fine spray, breaking the gasoline up rapidly and giving a quick-firing mixture.

Some of the advantages claimed for the device are a decided increase in economy, more power, greater flexibility, easier starting, less heating and more silent running. The economizer is manufactured by H. E. Mills, South Croyden, Surrey, England.



INTERIOR VIEW OF CARBO-LIGHT TANK GENERATOR